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ABSTRACT

A study of 1,500 college students was conducted to determine the effect of sex role attitude and cognitive style on the career decision-making of college men and women. An overlapping longitudinal design (which allowed the study of undergraduates at one-year intervals), selected personal interviews, and five measures of sex-role attitude, cognitive complexity, and career choice comprised the methodology and design of the study. Results indicate that gender and sex role attitudes continue to restrict student career options. Selected results of the study are that (1) beliefs about the role-appropriate behavior of others (especially women) precedes and determines one's sex role concept: (2) feminine related sex-role attitudes and degree of cognitive complexity regarding female dominant career choices also predicted gender dominant choices: and (3) personality characteristics associated with each occupational type on the Holland Vocational Preference Inventory do not always apply to both men and women. Interview results showed that instructors or courses were the most significant influence on persons who had changed their career decisions and that work-related field experience generally resulted in being less optimistic about one's future. (Interview results and schedules and statistical analysis of data are appended.) (MEK)

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THE INFLUENCE OF SEX ROLES AND COGNITIVE STYLES ON THE CAREER DECISION-MAKING OF COLLEGE MEN AND WOMEN

Vincent A. Harren
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February, 1979

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I. INTRODUCTION

Sex Role Attitudes

Both the popular and professional literature has documented the changes in our society's conceptualization of femininity and the female sex role. During the past ten years, these changes in persons' attitudes toward the role of women not only have been evident in the literature, but also have been directly reflected in the passage and enforcement of state and national level equal rights legislation. As our conception of the female sex role has begun to change, it is likely that many of the commonly accepted assumptions of the male sex role are changing. In recent years, the new men's liberation movement (Farrell, 1973, 1974 and 1975) is directed toward expanding our conceptualization of masculinity. The men's movement is attempting to bring about a change in sex role attitudes such that both female and male sex role constrictions can be transcended.

The effect of sex role attitudes on the career decision-making process is not well understood. Much of the research has focused on the outcomes of the career decision-making process, i.e., person's choices of field of study or occupation, not on the decision-making process itself. In addition much of this research has been restricted to the study of women and the relationship of personality and background to the development of career orientation in women and to the typical or atypical career choices of women. No comparable attention has been given to these same factors in men. Moreover, some of these studies have had design problems which may have influenced their findings.

Cognitive Styles

The effect of sex role attitudes on the career decision-making process and outcomes may be mediated by cognitive style; that is, the way in which men and women perceive, interpret, and respond to their environment or, more specifically, the way in which

they process information. For instance, Dinklage (1967) found that students differed in their use of eight decision-making styles during discussions of their career and life decision-making. Bodden and Klein (1973) found that persons used more cognitive constructs (were more cognitively complex) when judging occupations they disliked than when judging occupations they liked. Streufert (1975) found that high conceptual level students profited from career exploration courses, while low conceptual level students did not. Finally, Karmen (1972) compared traditional and non-traditional women on a large number of variables including sex role attitudes. She found that the most differentiating variable was thinking orientation, a measure of the propensity for using the scientific, analytic method of thinking. It should be pointed out that all of these measures are uncorrelated with intelligence, and can thus be properly referred to as measures of cognitive style.

These studies suggest, then, that cognitive style may have a more direct influence on the career decision-making process and outcomes than sex role attitudes. It is thus proposed that the study of both sets of variables is necessary in order to understand their influence on each other and on career decision-making.

Career Decision-Making

Career decision-making can be conceptualized from a number of different points of view. Since 1960, vocational theorists have advanced models of career decision-making, employing concepts from psychological decision theory and developmental psychology. In their review of six of these theories, Jepsen and Dilley (1974) suggest that these theories lack sufficient specification of three important variables: the population of decision situations, the types of decisions, and the characteristics of the decision-maker. Perhaps these theories' lack of specification is a function of their comprehensiveness, that is, the range of behavior to which the theories are intended to apply.

A more focused approach is needed in which the study of career decision-making is limited: to a specific context, or decision situation; to specific

types of decision; and to a limited number of decision-maker characteristics. The author has designed and developed an instrument called the Assessment of Career Decision-Making (ACDM) which takes this more focused approach. The ACDM is designed to assess college students' degree of progress in making and implementing three related career decisions: the decision to go to college; choice of major; and choice of occupation. In addition, the instrument measures three decision-making styles: rational, intuitive, and dependent. The ACDM is an application of the Tiedeman and O'Hara (1963) decision-making paradigm and includes modified decision-making styles proposed by Miller and Tiedeman (1972) and Tiedeman and Miller-Tiedeman (1975).

Research Procedure

Three sex role attitude questionnaires were used in this study: the Bem Sex Role Inventory (BSRI), which measures the degree to which persons perceive themselves as masculine, feminine, or androgynous (Bem, 1974); the Attitudes Toward Women Scale (AWS), which measures person's conservative or liberal views about appropriate roles for women (Spence and Helmreich, 1972); Spence, Helmreich, and Stapp, 1973); and the Attitudes Toward Masculine-Transcendence Scale (AMTS), which measures the degree to which persons reject traditional masculinity and accept non-traditional masculinity (Moreland and Van Tuinan, 1976).

The cognitive style measures used were: The ACDM Decision-Making Styles (Harren, 1976); the Cognitive Differentiation Grid (GRID) (Bodden, 1970) and the Paragraph Completion Method (PCM) used by Streufert (1975) to measure conceptual level.

The career decision-making process was measured by the ACDM Decision-Making Tasks of College, Major, and Occupation. The career decision-making outcomes studied were: Whether or not a major and occupation have been chosen; the students' degree of satisfaction with these choices; and the degree to which these choices reflect male or female-dominant fields.

The procedure involved administering the above measures to college men and women at each class level, freshmen, sophomores, juniors, and seniors. These

students were retested one year later to determine changes in attitudes, cognitive styles, and career decision-making. Retested students were compared, within their respective classes, to other students initially tested on the same campus and on other campuses. These comparisons determined the degree to which the results represent developmental phenomena within the college context, and the degree to which they can be generalized to other college student samples.

Finally, structured interviews were conducted with selected students according to test score patterns to determine past career relevant experiences, and experiences during the one-year interval between initial testing and retesting. The purpose of the interviewing was to provide concurrent validity data for the instruments and to provide case study data for use in designing a career decision-making program for college students.

Purpose of the Research

The primary purpose of this research is to determine the effects of sex role attitudes and cognitive styles on the career decision-making of college men and women. It is expected that sex role attitudes indirectly affect career decision-making through the mediation of cognitive styles, which more directly affect career decision-making. It is also expected that sex role attitudes have a greater influence on career decision-making than gender; that is, being male or female.

The secondary purpose of this research is to design a career decision-making program to increase the career options and the career decision-making competency of men and women. This is accomplished by modifying existing training techniques toward the following objectives: to influence sex role attitudes such that both male and female sex role constrictions can be transcended; and to influence cognitive styles so that students will be more effective in choosing and progressing through careers which are personally satisfying and productive to society.

II. REVIEW OF THE LITERATURE

Sex Role Attitudes

Much has been written about the origin and development of sex role attitudes and about their pervasive influence on human behavior. Our interest here, however, is on identification of important constructs, their means of measurement, and their relationship to vocational behavior.

Sex Role Self-Concept and Stereotypes

Early conceptions of sex roles considered masculine traits and feminine traits to represent two ends of a bi-polar continuum, with most men falling toward the masculine end and most women falling toward the feminine end. Accordingly, scales to measure masculinity-femininity were so designed and validated according to their ability to differentiate men from women. An alternative conceptualization suggested by Constantinople (1973) is one in which masculinity and femininity are considered separate dimensions, with each present to some degree in both men and women. This conceptualization underlies the Bem Sex Role Inventory (BSRI, Bem, 1974). Bem's concept of psychological androgyny, a person who possesses the characteristics of both sexes, is of interest here. Bem (1975) found that androgynous men and women tended to show more "feminine" behaviors than non-androgynous persons in a situation designed to elicit that type of response, and more "masculine" responses in a situation in which those behaviors were appropriate. Thus, androgynous individuals may be more flexible in response to situational demands. In addition, Spence, Helmreich and Stapp (1975) demonstrated a positive relationship between androgyny and self-esteem ($r = .77$ for men, and $r = .83$ for women). However, they found generally low correlations between self ratings and ratings of "typical" men and women. Thus, the attribution of sex role characteristics to self is relatively independent of sex role stereo-

types, that is, ascribing sex role characteristics to others.

Beliefs About Appropriate Sex Roles

Another approach to sex role stereotyping is to determine what men and women regard as appropriate roles for each sex. Thus, the question is not how men and women typically are, but how they should be. This approach may get at what sex role standards persons hold, and thus may influence not only their own behavior, but also the behavior of same-sexed and opposite-sexed others. Spence and her colleagues have developed a scale called the Attitudes Toward Women Scale (AWS) (Spence and Helmreich, 1972; Spence, Helmreich, and Stapp, 1973) which is designed to measure beliefs about appropriate roles for women. Spence, Helmreich and Stapp (1975) found persons holding more traditional attitudes concerning sex appropriate roles for women also perceived larger differences between the sexes. This finding corroborates the earlier results of Ellis and Bentler (1973).

An instrument comparable to the Attitudes Toward Women Scale is needed to measure the attitudes men and women have about the role appropriate behavior of men. According to Brannon (1976) about 135 measures have been designed to assess attitudes towards women's roles. Only one instrument has been found which measures attitudes towards masculinity (Dean, 1954). This scale, however, is extremely traditional in its concept of masculinity as is evidenced by its title, the Anti-Femininity Scale. Moreland and VanTuinan (1976) have begun the development of an Attitudes Toward Masculine-Transcendence Scale (AMTS). The initial item pool was developed using a four-factor conceptualization: Dominance, Achievement Orientation, Non-Emotionality, and No Sissy Stuff. A preliminary factor analysis suggests that two major factors underlie these dimensions: rejection of traditional masculinity and acceptance of non-traditional masculinity.

The three sex role instruments to be used in this research, then, are: the Bem Sex Role Inventory, the Attitudes Toward Women Scale, and the Attitudes Toward Masculine-Transcendence Scale.

Relationship of Sex Roles to Vocational Behavior

A major line of research has been the study of male-dominant and female-dominant occupations and the characteristics of students who choose traditional occupations (men choosing a male-dominant field, women choosing a female-dominant field) or non-traditional occupations (choosing an opposite sex-dominant field) (Almquist, 1974; Crawford, 1978; Hawley, 1972; Valentine, Ellinger and Williams, 1975; Richardson, 1974; Tangri, 1972; Wolkon, 1972; and Karman, 1972). While all of these studies are not reviewed here, it should be pointed out that there are at least three problems with this approach.

The first problem has to do with how occupations are classified as male or female dominant. The typical procedure has been to examine the distribution of men and women in different occupations, based on U.S. Bureau of Census data, and then using some percentage cut-off points (which vary from study to study) to define the two categories. This procedure assumes that subjects know what the distribution of workers by sex are, and that this knowledge determines their preferences. Shinar's work on the sexual stereotypes of occupations (1975) more appropriately assigns values to occupations through subjective perceptions of students, and these values represent a continuum of sexual stereotyping from masculine through neutral to feminine.

A second problem has to do with the contamination of male versus female dominant occupations with occupational status and prestige. For instance, Feather (1975) found that perceived social status of the occupation had a greater effect on students' responses than did the degree of male dominance of the occupation. The two variables are in fact related, that is, more male dominant occupations are of high prestige and more female dominant occupations are of low prestige. Nevertheless, it is difficult to sort out what is the influence of prestige and what is the influence of sex roles.

A third problem has to do with the variation in the influence of sex roles on occupational preference. Hawley (1972) found that women preparing for teaching careers believe significant men in their lives dichotomize attitudes and behavior into masculine-feminine

categories; while, women majoring in math-science fields believe men do not see sex as a determinant of attitudes and behaviors. In addition, McMillan (1972) studied the attitudes of college men toward the level of career involvement they would want their future wives to have. It was found that the men's attitudes varied, depending on their major field in college. Thus, for both men and women, the content of one's career choices -- type, or field of major and occupation -- interacts with the degree to which sex roles influence vocational behavior.

These three problems are addressed in this research. Moreover, a major premise underlying this research is that the influence of sex roles on career decision-making is mediated by a number of cognitive style variables which will be discussed below. What is needed is instrumentation and a research design which takes into account the above problems, while at the same time establishes the hypothesized linkage between sex roles, cognitive style, and vocational behavior.

Cognitive Style

Cognitive Complexity

Cognitive complexity is an information processing variable which is unrelated to intelligence. It is a construct central to Kelly's Personal Construct Theory (1955) and is measured by Kelly's Role Construct Repertory Test (Role Rep Test). The Role Rep Test allows subjects to construe or describe other persons according to whatever categories, constructs or dimensions they find meaningful in thinking about others. Bieri's work (1955) in interpersonal attraction determined that 12 independent construct dimensions were most commonly employed, and consequently modified the relatively unstructured Role Rep Test by requiring subjects to use these 12 constructs to describe others. Bodden (1970) adapted Bieri's instrument for research in vocational behavior. This adaptation is called the Cognitive Differentiation Grid (GRID). Ths GRID has 12 occupational role titles across the top of the grid and 12 vocationally relevant construct dimensions down the side of the grid. Sub-

jects rate each occupational role title on all 12 construct dimensions by using a 6-point, Likert-type scale. A single total cognitive complexity score is obtained by comparing each rating in a row with the rating below it in the other rows in the matrix. In comparing any two construct rows, a score of 1 is given for every exact agreement of ratings for any one occupational title. The higher the score the more cognitively simplistic the subject, since he or she has not varied the ratings either by construct or by occupational role titles. Using this instrument, Bodden and Klein (1972) found that cognitively complex individuals were more likely to make occupational choices consistent with their personality (using Holland's classification system) than were cognitively simplistic persons. Finally, Bodden and Klein (1973) found that persons used more cognitive constructs when judging occupations they disliked than when judging occupations they liked. In this study, subjects were allowed to fill in the blanks across the top of the grid with six occupations they disliked and six occupations they liked from a list provided.

This procedure was further adapted to take into account the problems discussed above in studying the influence of sex roles on male and female dominant occupations. The 12 occupations to be rated were in three groups of four occupations representing male dominant, female dominant, and sex balanced occupations, matched across the three groups for occupational status and prestige. The occupations will be randomly distributed across the top of the GRID. The occupations selected used data supplied by Shinar (1975) and Allan (1975) on gender-dominant occupations, and by Blau and Duncan (1967) and Fossum and Moore (1975) on occupational status and prestige. Low androgynous subjects are expected to use more independent constructs in describing opposite sex dominant fields, and overall to be less cognitively complex.

Conceptual Level

Streufert (1975) studied students' progress in two types of career exploration courses; a structured didactic course, and an unstructured, experiential course. He classified students as high or low in

Conceptual Level (CL), and found that high CL subjects profited from both types of courses, while low CL subjects did not profit from either type of course. Moreover, high CL subjects profited more from the experiential type than from the didactic type of course.

Conceptual Level is measured by the Paragraph Completion Method (PCM), a semi-projective device designed by Hunt (1971). Streufert (1975) characterizes Hunt's construct as follows:

> Although a person's conceptual development is thought of as a continuous process, the process is divided into a series of stages primarily to facilitate analytical procedures. These stages may be assessed and located along a developmental continuum with Hunt's formulation of Conceptual Level (CL). At the lower end of this continuum is an unsocialized and aggresive person who resists and avoids external imposition. Ambiguity cannot be tolerated and information is processed in a very simple and concrete manner. In the middle levels more abstract and complex information is received and processed within dichotomous (right-wrong/good-bad) categories according to absolute and external dictates. This, however, gives way to greater self-delineation and reliance upon internal standards. Subsequently, absolutes are questioned and challenged. The highest conceptual level is denoted with interdependence between self and environment consisting of clear and detailed self-delineation, a selective openness to external imposition, and an avoidance of dependency. Also at this level, a high degree of ambiguity can be tolerated and the information processed is very abstract and complex.
>
> In brief, the basic dimensions for defining a person's evolving cognitive system according to the conceptual level model are: the quantity, complexity, and abstractness of the information processed; the degree of self-delineation; and the extent of interdependence with external absolutes (pp. 17-19).

Thus, since Conceptual Level involves the capacity to process external information and internal information (self-delineation); and since it involves degree of interdependence with the environment, it is expected to influence career decision-making.

Decision-Making Styles

This third cognitive style variable will be described later, since it is measured by the same instrument designed to measure the career decision-making process.

Career Decision-Making (CDM)

The CDM theory employed in this research and in the design of the Assessment of Career Decision-Making (ACDM) is that of David Tiedeman and his associates (Tiedeman, 1961; Tiedeman and O'Hara, 1963; Miller and Tiedeman, 1972; Tiedeman and Miller-Tiedeman, 1975). Only selected aspects of this theory, which are relevant to the ACDM are presented here as interpreted by the author.

The Tiedeman (et al.) approach to career development contains a view of human beings as responsible for their behavior and capable of choosing through purposeful action. Life confronts the individual with discontinuities of experience, which are environmentally caused by the nature of the structure of society. These discontinuities are new physical and social environments currently experienced or anticipated by the individual (e.g., the college environment). These environments present the individual with problems to be resolved; that is, society's expectations for the resolution of the CDM tasks confronting the individual at that stage of one's development (e.g., choice of major and occupation). Effective resolution of each CDM task gradually increases one's control over one's own behavior and environment. This leads to a greater sense of agency, owning of responsibility for one's behavior, and in turn, to further purposeful action as new discontinuities and their attendant CDM tasks are confronted.

The CDM tasks are resolved through a seven-

stage psychological process involving the cognitive functions of differentiation and integration. The stages are described below, the first four of which are anticipatory or planning stages, and the last three are implementation, or action stages.

Exploration

This stage is marked by unrestricted exploratory considerations. It is characterized by generalized, vague concerns with little or no progress toward choice. Knowledge of self and the occupational world is a felt need, but the individual has developed no strategy or plan of action for satisfying this need. There is an absence or near absence of negative choices (exclusions of alternatives from the range of possibilities). This is accompanied by vague anxieties about the future.

Crystallization

This stage represents progress toward, but not attainment of choice. The individual recognizes alternative possible choices and at least some of the consequences of these alternatives. Conflicts are recognized; advantages and disadvantages are weighed; and the bases for a decision are being developed, at least implicitly. The process of narrowing down the range of possibilities through negative choices is operating. False steps and inappropriate earlier decisions are recognized and used as bases for further decision.

Choice

This stage represents a definite commitment with some degree of certainty to a particular goal. It is accompanied by expressions of satisfaction and relief for having made the commitment. The individual may focus on aspects of self which are evidence of an appropriate decision. This stage further represents a swing from the pessimism characteristic of the exploratory stage to a kind of naive optimism about the future. The individual usually expresses a singleness of purpose and an unswerving attitude of

goal direction, as well as eagerness and impatience to reach the goal. Focus upon the consequences of the decision and further planning are not yet in evidence.

Clarification

This stage represents a process of closure in which the indiviudal is involved in clarification and elaboration of the consequences of one's commitment, as well as in planning the details and next steps to be taken to follow through on the commitment. The individual is usually engaged in a process of elaboration and perfection of one's self-image and image of the future. Although planning the overt action to carry out the commitment is characteristic of this stage, the overt action itself may be delayed until the environmental conditions are appropriate for action.

Induction

This stage marks the beginning of the implementation of a decision; the point at which the individual comes into reality contact with a new environment. One begins the process of accommodation to a new group of people and a new situation in the living out of one's decision. The individual's primary mode of interaction is passive. One is hesitant and is looking for cues from others in the group to determine what the group's values and goals are, and what the group's expectations of one are. While there is a general defense of self and a giving up of aspects of self to group purpose, the individual needs to feel some level of acceptance of one's uniqueness by the group. Gradually, one identifies with the group through the assimilation of one's individual values and goals into the group's values, goals and purposes. This stage ends when a person becomes aware of being accepted by the group.

Reformation

In this stage the individual's primary mode of interaction is assertive rather than passive.

one is highly involved in the group, enjoins the group to do better, and acts upon the group in order to bring its values, goals and purposes into greater conformance with one's own values and goals (which have become somewhat modified during induction). One also acts upon the out-group to bring their view of one's identification with the in-group into greater consistency with one's own view. There is a strong sense of self, which is somewhat lacking in objectivity. At the same time self is abandoned to solution and group purpose. The result of this stage is a modification of the group's values, goals, and purposes.

Integration

In this stage older group members react against the new member's force for change, which causes the individual to compromise or modify one's intentions. This results in a greater objectivity towards self and towards the group's purposes. A synthesis is achieved which both the individual and the group strive to maintain through collaborative activity. The individual is satisfied, at least temporarily, and one has an image of self as successful, while the group also considers one successful.

At any given time the individual is in one or another of these seven stages with respect to several overlapping CDM tasks. For example, the college undergraduate is in the process of implementing the decision to go to college, and in some stage of planning with respect to decisions about major and occupation. Moreover, it is assumed that prior completed decisions and decisions in the process of implementation affect decisions in the planning stages. Finally, the seven-stage process is presumed to be ordinarily progressive, but the possibility of regression and recycling is recognized.

This seven-stage process, hereafter referred to as the CDM process, provides the theoretical foundation upon which the decision-making task scales of the ACDM are based. The decision-making style scales of the ACDM will be treated in the next section of this review.

The ACDM is an extension of an earlier instru-

ment, the Vocational Decision-Making Checklist (VDC), developed by this author (Harren, 1965, 1966). This instrument was constructed in order to empirically test part of Tiedeman and O'Hara's vocational decision-making paradigm (1963). A structured sample Q-Sort instrument was constructed to represent four stages of the CDM process -- Exploration, Crystallization, Choice, and Clarification, and two CDM tasks, Major and Occupation. Male college students responded to the items according to their relevance to self on a 9-point, forced distribution scale (from "most like me" to "least like me"). Without prior knowledge of the theory, students tended to sort the items in ways consistent with the hypothesized a priori categories. Through the use of factor analytic and analysis of variance procedures, the stages postulated by the theory were demonstrated to exist and to be factorially discrete.

Following its original construction, the instrument was used in two studies in its original Q-Sort format (Capuzzi, 1968; Goodson, 1969). Capuzzi classified subjects by stage at pre- and post-counseling but found no significant differences between counseled and control subjects in number of changes in classification. Goodson also used the instrument to classify subjects, but only at pre-treatment. Two problems emerged from these studies; many subjects had difficulty understanding and following the Q-Sort directions; and, secondly, this use of the instrument to classify students into one of the four stages assumes that the stages are non-overlapping categories. To resolve these problems the Q-Sort format was replaced by a simple checklist format, and a new scoring procedure was designed. This scoring procedure yields a score for Major and a score for Occupation and a composite score representing how far along the continuum of the CDM process the student has advanced.

The author compared the scores of Goodson's subjects (179 entering undecided freshmen and women) with the scores from the author's original sample of 86 men, predominantly juniors and seniors (Harren, 1965). The following conclusions were drawn (Harren, 1976): (1) Freshmen scored highest in Exploration, with decreasing scores through Choice; whereas juniors and seniors scored highest in Choice, with

decreasing scores through Exploration. (2) There were no significant differences between the scores for men and women. (3) The four stages were uncorrelated or moderately negatively correlated with each other. (4) Across the two CDM tasks, Major and Occupation, the corresponding stages were moderately positively correlated, except for Clarification.

The first published study using the instrument in its checklist format was reported by Wachowiak (1972; 1973). He compared model-reinforcement counseling with traditional counseling and no counseling, using the Major scale pre- and post-counseling. (All of the subjects were males.) The post-counseling scores for the model-reinforcement and the traditional groups were significantly higher than the control group. While the model-reinforcement group did not differ significantly from the traditional group, the model-reinforcement subjects obtained a somewhat higher average score. These results were replicated by Schneider (1971). Wachowiak also correlated the change scores of the two counseled groups with the Gough Adjective Checklist. Improvement on the Major scale was significantly correlated with Dominance, Aggression, Heterosexuality and Self-Confidence, and negatively correlated with Abasement.

Similar results were found in a study by Smith and Evans (1973) who compared experimental group counseling, individual counseling and no counseling using both the Major and Occupation scales of the instrument, and including both men and women subjects. They found no main or interaction effect for sex of subject or for counselor. They did find, however, that the change scores for the experimental group counseling group were significantly higher than the individual counseling group, and that both counseled groups were significantly higher than the control group.

A study by Berman, Gelso, Greenfeig and Hirsch (1977) also found significant results. In this case, the subjects were adult women returning to college after some years outside of an educational context. The age range was from 20 to 50 with a mean age of 36. Three counseled groups were used, a 12-week counseled group, a 6-week counseled group, and a wait-list control group. The wait-list group was pre- and post-tested over a one month wait period, and re-tested again after six weeks of counseling. The significance

of this study, in contrast to the others reported is that a "motivated control group" was used. All three groups significantly improved on the Occupation scale after counseling. The 12-week group also significantly improved on the Major scale, although the two six-week groups did not. More importantly, the wait list control subjects did not improve significantly during the one-month wait period, but did improve after six weeks of counseling. Similar, although somewhat more equivocal results, because of design problems, were found by Hoffman (1973).

As part of a large scale, systematic evaluation of the services of a university counseling center, VanAtta (1974) administered the instrument pre- and post-counseling to all clients of the counseling center during one year who requested help with educational vocational problems. He found that the post-test scores were significantly higher than the pre-test scores. Again, no significant differences were found between men and women. This study is important in that these subjects were bona fide, self-referred clients of a typical counseling center; whereas other studies utilized solicited subjects or enrollees in career planning courses.

Streufert (1975) used the instrument to evaluate the effects of structured and unstructured career exploration courses with subjects differing in conceptual level. Of the four dependent variables used, only the ACDM indicated significant results in the multivariate analysis. Streufert also identified an important independent variable, conceptual level. Subjects were classified as high or low conceptual level by the median split procedure, and only high conceptual level subjects were found to profit significantly from the career exploration program. This result is important in that other studies (Wachowiak, 1972; Schneider, 1971) failed to demonstrate differential treatment effects with their independent variables. As has been noted earlier, this is the basis for selecting conceptual level as one of the cognitive style variables in this research.

More recent studies also report positive findings. Cochran, Hoffman, Strand, and Warren (1977) found that students significantly increased their scores on the Major scale of the ACDM after two hours of computer interaction with Educational Testing

Service's System of Interactive Guidance and Information. There scores on the Occupation scale, however, did not significantly increase. In addition, Evans and Rector (1978) found that students who had participated in a college course in career decision-making had significantly higher post-test scores on Major and Occupation than a control group.

Few studies have employed designs that included follow-up testing to determine the stability of changes found at the end of treatment. An exception is a recent study by Tillar and Hutching (1979). They employed a six-week follow-up testing with the ACDM Occupation scale. The authors used four different treatment groups. For three of the groups, there were slight but non-significant decreases over the follow-up period. For the remaining group there was a slight, but non-significant increase over the follow-up period. While the degree of these changes were not significant, the direction of the changes for the four groups resulted in a significant interaction effect over the follow-up period. Thus, it appears that the ACDM is sensitive to delayed treatment effect, as well as loss of gains that are found at the end of treatment.

Finally, on the side of "negative results" only two studies are known to the author in which significant differences in ACDM scores were not found (Dye, 1976; Katz, 1975). In the Dye study, the instrument was only administered at post-test, and no significant differences were found among groups. Since no pre-test was given, however, it is not known if the groups were equated as to initial differences prior to treatment. In fact, in three of the studies reviewed, this has been the case so that covariance analyses were employed to adjust for initial differences. In the Katz study, the lack of significant improvement may have been due to the short duration and questionable relevance of the treatment. In this study, Swarthmore undergraduates spent one week off-campus, during their spring vacation, with alumni engaged in careers of potential interest to the students.

In summary, the results of the studies reported demonstrate considerable construct validity for the ACDM, and suggest that the theory upon which it is based is a viable one. Little evidence of the criterion-related validity of the ACDM is presently

available, and part of the present research addresses this question. Finally, the search for independent variables which may influence the CDM process has not been successful, with the exception of Streufert's finding regarding conceptual level. The present research also addresses this question.

Decision-Making Style

Dinklage (1967) developed a classification of decision-making styles whereby judges could reliably categorize students, based on discussions of their decision-making in educational, vocational, and personal areas. Eight styles were defined: planning, intuitive, compliant, fatalistic, impulsive, delaying, agonizing, and paralytic. She found that students differed in the use of these styles within and across the three decision areas. She also found some differences in style by sex and by type of school the student attended. The planning style is viewed as the most effective style, while the intuitive style may sometimes be effective. The remaining styles are considered ineffective or counter-productive (Miller and Tiedeman, 1972).

The author has collapsed these styles into three categories: Rational, Intuitive, and Dependent; each of which is measured in the ACDM. These categories are based upon the degree to which the individual takes personal responsibility for decision-making versus projecting responsibility outward toward fate, peers and authorities; and the degree to which the individual uses rational versus emotional strategies in decision-making. These three styles are described as follows:

Rational

This style is characterized by the ability to recognize the consequences of earlier decisions for later decisions. It requires an extended time perspective in which several sequential decisions are viewed as a means-ends chain. The individual anticipates the need to make decisions in the future and prepares for them by seeking information about self and the anticipated situation. The individual's

decisions are carried through deliberately and logically. They are effective to the degree that accurate information about the situation is acquired and the individual's self-appraisal is realistic. This style represents the ideal of the self-actualizing decision-maker, one who is the architect of one's own future as one lives it.

Intuitive

As in the rational style, the intuititve decision-maker accepts responsibility for decision-making. The intuitive style, however, involves little anticipation of the future, information-seeking behavior or logical weighing of factors. Rather, it is characterized by the use of fantasy, attention to present feelings, and an emotional self-awareness as the bases for decision-making. Commitment to a course of action is reached relatively quickly, and its basic "rightness" is felt internally. Often the individual cannot state explicitly how he or she decided. This style is less likely to result in effective decision-making than the rational style, due to fluctuations over time in the individual's internal state, and to limited capacity to accurately represent an unfamiliar situation in fantasy.

Dependent

Unlike the rational and intuitive styles, the dependent style is characterized by a denial of personal responsiblity for decision-making and a projection of that responsibility outside of self. The individual is heavily influenced by the expectations and desires authorities and peers have of him or her. One tends to be passive and compliant; to have a high need for social approval; and to perceive the environment as providing restricted or limited options. While this style may reduce the immediate anxiety asscciated with decision-making, it is likely to ultimately result in lack of fulfillment or personal satisfaction.

The influence of these styles on the CDM process and their relationship to the other cognitive

style variables and to the sex role variables is addressed in this research.

Outcomes of Career Decision-Making

In the present research, the career decision-making process is measured by the ACDM scales of College, Major, and Occupation. The question here is, what criteria or behavioral outcomes are predicted by these scales purporting to measure the CDM process? The most appropriate outcome is whether persons make satisfying choices of major and occupation. In this research, this outcome is referred to as "decisional status."

Decisional Status

A distinction is made in the literature between choice and preference. The former refers to the selection of an alternative which is currently being implemented; whereas, the latter refers to a differential liking of one alternative over others, or at most, an intention to choose that alternative at some future time. For example, a college student has chosen a college and is currently implementing that choice. The student may or may not have chosen a major, depending on whether he or she has officially declared a major, has been assigned an advisor in that major, and is taking courses to fulfill the requirements of that major. Finally, with regard to occupation, the student can state preferences, not choices, since he or she is not yet employed in an occupation.

While this distinction may be regarded by some as "hairsplitting," we believe it is important from a psychological perspective. Choices require greater commitment than preferences. Moreover, depending on the decision-making task, or type of decision, the severity of the consequences of the decision and its degree of reversibility will affect one's level of commitment.

Consequently, the two decisional status variables, choice of major and occupational "choice" (preference) may require low levels of psychological

commitment of the student. Regarding choice of major, it is known that college students change their major an average of three times over the course of their undergraduate program. Thus choice of major is reversible with minimal consequences, unless one persists too long with a major that is eventually discarded. Similarly, choice of occupation is reversible because it is a preference and is not yet implemented. Of the two variables, major and occupation, we decided to focus primarily on major since it is a more immediate choice criterion than preference for a future occupation.

The problem of using a straightforward choice-no choice criterion has been recognized by other researchers. Holland and Holland (1977) took into account the student's degree of satisfaction or dissatisfaction along with a stated criterion of choice-no choice, in order to distinguish degrees of indecision among students. Similarly, in order to establish a criterion of decisional status which would represent a greater and perhaps more stable commitment, we combined having made a choice with expressing a high level of satisfaction with that choice.

Students were dichotomized by partitioning the sample into two groups. Group 1 included those individuals who indicated that they had not made a choice of major. It also included those individuals who had made a choice of major but who indicated they were not highly satisfied with the choice. Group 2, on the other hand, consisted of those individuals who had made a choice of major and also had indicated that they were highly satisfied with their choice. Satisfaction was measured by a 9-point scale (1 = dissatisfied; 9 = satisfied) in response to the item, "How satisfied are you with this choice?" Students with ratings of 7 or above were classified as "highly satisfied."

This criterion of decisional status with respect to major was the outcome criterion selected, to be predicted by the ACDM Decision-Making Task Major scale. The ACDM is a "content-free" process measure; that is, it applies to whatever major or occupation the student is considering. Consequently, it is not expected that the Decision-Making Task scales will be predictive of the other outcome criteria used in this research, to be described below.

Male-Dominance Index

A second criterion of interest in this research involves the degree to which students choose traditional (same sex-dominant) or non-traditional (opposite sex-dominant) majors and occupations, as a function of their gender, sex role attitudes, and cognitive styles.

The typical approach to classifying occupations as male or female-dominant is by examining the distribution of men and women in different occupations based on U.S. Bureau of Census data and then using some percentage cut-off points to classify occupations as masculine, feminine, or neutral (Tangri, 1972; Wolkon, 1972; Feather, 1975; Crawford, 1978). In the present study, the degree of male or female dominance of occupations was viewed as a continuum expressed in terms of a male-dominance index (MDI), the proportion of males to females employed in each occupation (Allen, 1975).

Shinar (1975) has argued against classifying occupations according to the actual distribution of workers because such a classification ignores persons' subjective reality. That is, students' choices are based on what they perceive, not on what actually exists. Shinar found that sexual stereotypes were clearly defined and held in agreement by both men and women college students. Shinar, however, did not determine the degree of correspondence between these sexual stereotypes and the actual distribution of workers by sex in occupations. Consequently, in this study we compared the two by selecting 41 occupations for which there were available both male-dominance index scores (Allen, 1975) and sexual stereotype ratings (Shinar, 1975). The correlation was .91. Thus, Shinar's sample of college students' ratings of occupations as masculine, feminine, or neutral reflects the actual distribution of workers by sex.

Since we were interested in studying students' choice of major as well as occupational preferences, we assigned MDI values to 61 college majors and compared these values to the actual distribution of men and women in these majors at Southern Illinois University at Carbondale. The correlation was .95. Thus, not only do students have attitudes about the degree to which occupations are masculine or feminine,

but also these attitudes quite accurately reflect the actual distribution of men and women in the labor force. Moreover, this distribution of men and women in various occupations approximates the distribution of men and women in corresponding majors at Southern Illinois University at Carbondale. These findings provided sufficient justification for our use of the MDI values in this study.

Holland Typology

The third criterion used in this research involves the content of the students major and occupations; i.e., the particular field chosen. While we had no specific expectations, it may be that sex role attitudes and cognitive styles are predictive of choices of specific majors and occupations, or groups of fields. While we included the decision-making task scales in these analyses, as indicated earlier, it was expected that they would not be predictive of the content of persons' choices.

For this criterion, the system of classification of occupations developed by Holland (1974) was used. This system involves the grouping of occupations into six occupational environments that correspond to six personality types posited in Holland's model. The six occupational groups are: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. We also classified majors according to the Holland occupational typology. In some cases, however, a major could lead to employment in occupations classified in more than one Holland category. These majors were considered unclassifiable, and students with these majors were dropped from the analyses.

These three criteria, then, were used separately in this research, depending upon the particular research question at issue.

III. PROCEDURE

Design

Figure 1 presents the design used in this research. This design is an overlapping longitudinal design, which allows the study of the entire range of the undergraduate years during one year interval. Four samples of subjects (A-D) were drawn and tested at Time 1, October, 1976. Three of these same samples (A, B, and C) excluding dropouts, were re-tested one year later at Time 2, October, 1977. The fourth sample, D, was retested at the end of the senior year, while the students were still on campus. A fifth sample (A_1), entering freshmen in September, 1977, was tested in October, 1977, and re-tested after one semester in college, in February, 1978.

The values in parentheses in Figure 1 refer to the sample sizes. For the Time 1, five longitudinal samples, the sample sizes were determined on the basis of attrition rates reported by the SIU-C Office of Admissions. Data were available for three years, 1960, 1965, and 1970. The 1965 data were used, since the 1970 data may have been influenced by the political activism ferment and rioting in the early 1970's. The Time 2 sample size for the longitudinal sample are conservative estimates of the number of subjects available for Time 2 testing, given the attrition rates, and including some adjustment for subjects who changed their minds about continuing their participation in the project. The goal was to have 100 subjects at each class level, 50 male and 50 female subjects for whom there was complete Time 1 and Time 2 data.

This design has advantages over either a longitudinal or a cross-sectional design. A longitudinal design over the entire period of four years results in excessive attrition of subjects. Moreover, there is greater opportunity for extrinsic factors, such as politico-economic conditions to influence the variables under investigation. A cross-sectional design, on the other hand, does not allow the study of developmental phenomena, since differences at each

class level may not reflect a developmental process, but may be due to other factors. The overlapping design represented in Figure 1 allows for both cross-sectional comparisons of different samples (see vertical, dotted arrows), and longitudinal comparisons of the same samples at two points in time (see horizontal, solid arrows).

The design displayed in Figure 1 refers to the SIU-C campus. Without replication, the question of the generalizability of the results for students at other universities cannot be determined. Consequently, students at different class levels from other universities were administered the same instruments. No longitudinal data, however, were collected. The four universities selected were: Texas Tech University, Ohio State University, Virginia Commonwealth University, and the University of Houston. These universities were not intended to be representative of universities nationwide, but were "samples of convenience" in that former colleagues of the investigator were employed at these universities and were willing to participate in the research.

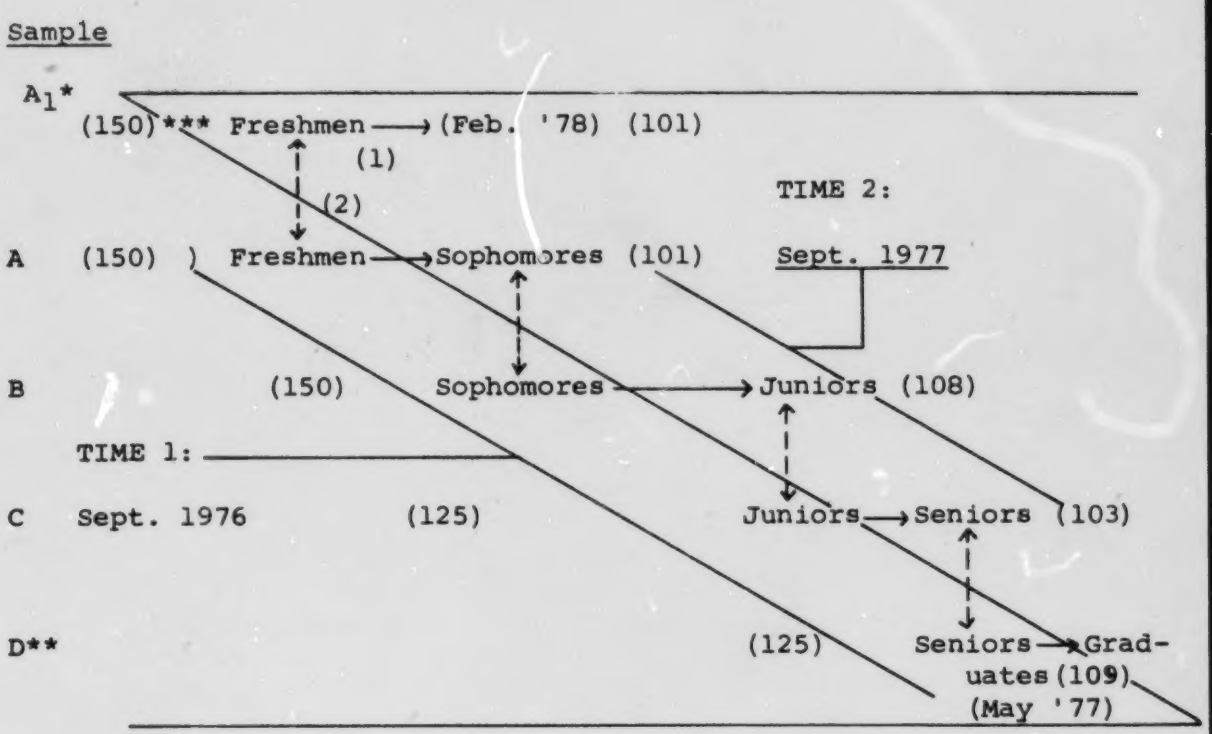
From the four universities combined, the goal was to obtain 100 subjects, 50 males and 50 females at each class level, for a total of 400 subjects. The data from these universities were pooled, and the four class levels and both sexes were represented in aggregate. The pooled sample (referred to as the non-SIU sample) was compared to the SIU sample, Time 1 data within each class. The results were used to determine whether the findings could be generalized beyond the SIU sample.

Sampling Procedures

For the SIU-C sample, students were solicited by mail from a computer tape of all registered students. Every fifth person who qualified for the research was solicited. All students who participated were paid for their participation. Excluded from the study were transfer students, part-time students, and students who had not been continuously enrolled in college (excluding summers) since high school graduation. This procedure was used to restrict the age range and to partially control for

Figure 1

Overlapping-Longitudinal Design


Sample
A1*
(150)*** Freshmen → (Feb. '78) (101)
(1)
(2)
TIME 2:
A (150) Freshmen → Sophomores (101) Sept. 1977
B (150) Sophomores → Juniors (108)
TIME 1:
C Sept. 1976 (125) Juniors → Seniors (103)
D** (125) Seniors → Graduates (109) (May '77)

*Sample A_1 is post-tested midyear to determine the first semester in college effects.

**Sample D is post-tested at the end of the Senior year, just before graduation.

***Numbers in parentheses refer to samples sizes.

(1) Solid Arrows refer to longitudinal comparisons, i.e., the same sample of subjects pre- and post-tested over time.

(2) Dotted Arrows refer to cross-sectional comparisons, i.e., respective classes for two consecutive years.

non-college, career relevant experience. This sample was intended to be representative of the bulk of the undergraduate student population, with women somewhat over-represented.

At the other universities research participants were solicited in a variety of ways: advertisements in student newspapers, posters, and direct solicitation of participation through classroom visitations. Thus, while the sampling procedures differed between the SIU and the non-SIU samples, there is no a priori rationale for assuming sampling bias with respect to the variables under investigation. Should the results reveal differences between the two samples, these differences in sampling procedure should be kept in mind. On the other hand, should no differences be found, support for the generalizability of the results is strengthened due to these differences in sampling procedures.

Interviewing Procedures

Following both Time 1 and Time 2, subjects were selected for structured interviews by the research staff. After Time 1, subjects with extreme low and high ACDM scores within each class were selected for interviews. The ACDM Composite score (Major + Occupation) was calculated for each student, and 10 students (5 male and 5 female) with the lowest scores and 10 students with the highest scores for each class were selected for interviews. These students were also paid for being interviewed. The post Time 1 interviews were conducted by interviewers without knowledge of the student's ACDM scores and were designed to elicit information about the family background and career development history of the student. The interview schedule used is contained in Appendix B. Following Time 2, the same procedure was used to select students for interviewing, except that ACDM change scores were used. Extreme positive and extreme negative changers on the ACDM composite score were selected. The interviewers elicited information about the students' career relevant experiences during the Time 1 - Time 2 interval. The interview schedule used post Time 2 is contained in Appendix B.

The purpose of this interviewing was to provide descriptive or qualitative information to aid us in the interpretation of the quantified data. The information was also used to develop a new theoretical model of career decision-making, which served as a guide for the design of the Career Decision-Making Program.

Instrumentation

Assessment of Career Decision-Making (ACDM)

This instrument contains the following scales: Decision-Making Styles: Rational (DMS-R), Intuitive (DMS-I) and Dependent (DMS-D); Decision-Making Task-College (DMT-C), a single weighted score indicating progress through the implementation stages of Induction, Reformation, and Integration; Decision-Making Task-Major (DMT-M), a single weighted score indicating progress through the stages of Exploration, Crystallization, Choice, and Clarification; with respect to major and Decision-Making Task-Occupation (DMT-O) a single weighted score indicating progress through the stages of Exploration, Crystallization, Choice, and Clarification with respect to occupation.

In order to estimate the test-retest reliability of the ACDM a sample of 73 undergraduates took the ACDM twice over a 2-week interval. The test-retest reliability for the DMT-M scale was .84; for the DMT-O scale, .83. For the three style scales the reliabilities were as follows: DMS-R = .85; DMS-I = .76; and DMS-D = .85. Based on the Time 1, SIU sample of 585 students, the intercorrelations among the style scales are as follows: DMS-R vs. DMS-I = -.33; DMS-R vs. DMS-D = -.09; DMS-I vs. DMS-D = .18. Thus the three style scales have relatively low intercorrelations. The intercorrelations among the three decision-making task scales are as follows: DMT-C vs. DMT-M = .24; DMT-C vs. DMT-O = .37; DMT-M vs. DMT-O = .75. The high correlation between the Major and Occupation scales is due in part to the fact that the four stages of the decision-making process are involved. In addition, for many students the two decisions are in fact highly related.

Regarding the validity of the ACDM, evidence for

its construct validity is presented in the review of the literature section of this report; while evidence for its criterion-related validity will be presented in the results section of this report.

Bem Sex Role Inventory (BSRI) and Attitudes Toward Women Scale (AWS)

These instruments have been widely used in the research literature, and the reader is referred to the studies cited in the review of the literature section for information regarding their statistical properties.

Vocational Cognitive Complexity Grid (GRID)

Bodden (1970) reports a test-retest reliability of .82 over a two-week interval. In addition, Bodden and Klein found a significant correlation (.30 point-biserial) with Holland's Vocational Preference Inventory code, and stated choice of occupation.

Paragraph Completion Method (PCM)

Extensive data on this measure of cognitive complexity is presented by Hunt (1971). In addition Streufert (1975) reported median interjudge reliability ratings of .85. In the present research, the protocols of the Time 1 SIU students (N = 585) were rated by pairs of judges in successive sets of 20 protocols. Of the 28 sets of protocols, only three sets did not reach an acceptable criterion of .69 interjudge reliability. Thus, the reliability of the PCM, despite it's semi-projective nature was considered to be satisfactory.

Attitude Towards Masculine Transcendence Scale (AMTS)

This is a new instrument developed by Moreland and VanTuinan (1976). A preliminary factor analysis revealed a single, bi-polar factor representing traditional versus liberal attitudes towards men's roles,

thus justifying the use of a single score for the scale. Other information on its statistical properties are not yet available. Its justification for use in this research rests on its uniqueness as a measure of attitudes towards men's sex roles. Nevertheless, results involving the AMTS to be reported in the next section will be interpreted with caution, in keeping with this lack of information about the statistical properties of the instrument.

IV. RESEARCH QUESTIONS

Figure 2 presents the major thesis of this research. From right to left, Decisional Status (having made a satisfying choice of Major) is expected to be most directly influenced by the CDM process with respect to Major (DMT-M); in turn, this process is expected to be influenced by cognitive styles; while sex role attitudes and gender are expected to influence decisional status only indirectly, via their influence on cognitive styles. This hypothesized ordering of variables affecting decisional status and CDM is based on the review of the literature.

Figure 3 presents the hypothesized relationships among the influencer variables and the other two criterion measures of CDM Outcome. Again, the hypothesized ordering of the variables is based on the literature review and on the belief that changing attitudes toward sex roles may have diminished the effects of gender differences commonly reported in the literature in past years. These hypothesized relationships are examined in the final three research questions presented below. Prior to their examination, however, more fundamental research questions regarding the variables and the samples under investigation need to be addressed. Thus the ordering of the research questions below proceeds from attention to the more fundamental questions to the questions addressing the three criterion variables used in this study.

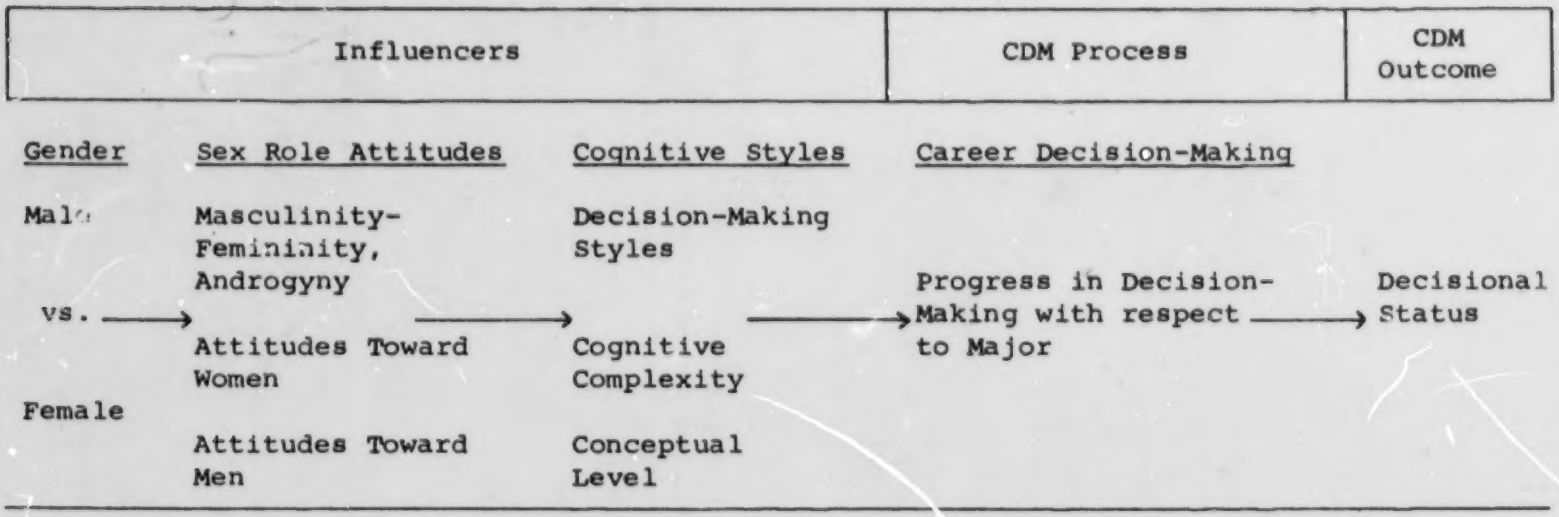
Question 1. Gender
How does CDM vary between men and women?

All of the variables in this study were examined within each sex, across sexes, and by total sample. While some gender differences are expected, the magnitude of these differences relative to sex role attitudes and cognitive styles is expected to be smaller.

Question 2. Class
How does CDM vary according to academic class level, as Freshman, Sophomore, Junior, or Senior?

Figure 2

Hypothesized Relationships Among Variables
Predicting Decisional Status*



*Arrows indicate direct influence of one set of variables upon another. The more variables intervening in the chain, the less the expected influence.

Figure 3

Hypothesized Relationships Among Variables
Predicting Gender-Dominance and Holland Typology

Influencers			Outcome
Gender	Sex Role Attitudes	Cognitive Styles	
Male	Masculinity, Femininity, Androgyny	Decision-Making Styles	Gender-Dominance of Major and Occupation
vs. →	→	→	→
	Attitudes Toward Women	Cognitive Complexity Complexity	Holland Category of Major and Occupation
Female	Attitudes Toward Men	Conceptual Level	

This question deals with the differences across class levels in college. No gender differences across class levels are expected. However, on all of the other variables in this study, scores are expected to increase by class level. That is, as class level advances, students should be: More androgynous, and more liberal in their attitudes toward the sex role appropriate behavior of women and men; more rational in decision-making style, more cognitively complex, have higher conceptual level scores, and have higher scores on level of decision-making.

Question 3. Time
How does CDM vary across time?

The same differences expected at each class level are expected to be found when retesting the same subjects after a one-year interval. That is, students will have higher scores upon retesting than at initial testing.

Question 4. Time by Class
What CDM variations found at each class level are not attributable to CDM development?

This question deals with comparisons of respective classes at initial testing and at retesting (see Figure 1, Design section). If no differences are found, then developmental inferences are justified. If differences are found, then these are attributable to differences in subject characteristics or to differential dropout rates. That is, if the differences found at each class level (Question 2) are not equal to the differences across time (Question 3), then either the research participants vary in some unknown but relevant way, or with respect to the variables in question, there is a disproportionate relationship between those subjects who drop out of college and those who remain.

Question 5. University
How stable are CDM variations across different universities?

This question involves a comparison of the SIU sample with the non-SIU sample within each class level.

While it is expected that there will be no differences due to university, the results will determine to what extent generalizations across different samples of college students are justified.[1]

Question 6. Sex Role Attitudes
To what extent does perception of self as Masculine, Feminine, or Androgynous influence one's beliefs about the sex role appropriate behavior of men and women?

This question deals with the degree of interdependence among the sex role attitude variables. The assumption is made that one's self-ascription of sex role characteristics (or sex role self-concept) influences one's other-ascription (or appropriate sex roles attributed to others). Moreover, it is expected that the perception of self as androgynous will be predictive of liberal attitudes toward the role appropriate behavior of women and men.

Question 7. Cognitive Styles
What are the relationships among the different measures of cognitive style?

Since there is no theoretical rationale for inferring a causal relationship among the cognitive style variables, this question will examine the intercorrelations among the variables. It is expected that students who are high in cognitive complexity will also be high in conceptual level and will be

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[1]In the original proposal, non-college students of the same age were to be included in this study, to determine the degree to which the results could be generalized to such persons. The intent was to determine the degree to which person's CDM was a function of the influence of the college environment, versus a function of maturation (age) and work experience. Unfortunately, less than a 4% participation rate for non-college research participants was achieved, despite repeated efforts. Thus, the results of this study must be limited in their generalizability to the college students sampled, and the question of the influence of the college environment remains unanswered.

high on the rational, rather than the intuitive and dependent decision-making styles.

The above seven research questions address the more basic or fundamental issues in this research. The remaining three research questions have to do with the prediction of the three outcome variables selected for this research.

Question 8. Gender-Dominant Majors and Occupations
How does choice of gender-dominant majors and occupations vary according to sex role attitudes and cognitive styles?

This question deals with the influence of sex role attitudes and cognitive styles on career choice. The relative importance of the predictor or influencer variables was presented in Figure 3. It is expected that the influence of gender will be mediated by the sex role and cognitive style variables.

Question 9. Holland Typology
How does choice of major and occupation, classified by Holland Category vary according to gender, sex role attitudes and cognitive styles?

This question deals with the content of students' choice of major and occupation; i.e., the particular field chosen, and the degree to which these choices can be predicted by the influencer variables. The relative importance of the variables are also presented in Figure 3.

Question 10. Decisional Status
How does having made a satisfying choice of major and occupation vary according to gender, sex role attitudes, cognitive styles, and progress in the decision-making process?

This question addresses the overall thesis of this research, as presented in Figure 2. It is expected that decisional status will be most directly influenced by progress in the decision-making process, and that the latter, in turn, will be influenced by cognitive styles, sex role attitudes, and gender, in that order.

V. RESULTS

This chapter is organized as follows. First, a description of the sample is presented; then the results are presented for each research question in turn; and finally, the main findings are summarized. The results from the interview data will be presented in the discussion chapter. Due to the large amount of data to be presented, the tables will be presented in sequence at the end of this chapter, rather than interspersed in the body. Source tables will be presented in the Appendix. Finally, Figure 4 is presented prior to the tables at the end of this chapter. Figure 4 contains a variable list with the scale designations for each variable. The reader is referred to Figure 4 to determine the variable involved, since the scale designations are used in the tables and in the body of this chapter.

Description of the Sample

Table 1 presents the distribution of subjects by college class and sex for the SIU sample and for the non-SIU sample. For both samples, subjects are relatively equally represented across class levels and for each sex, with women slightly over-represented. Of the 713 subjects tested at Time 1, 451 were re-tested at Time 2. It can be noted that the greatest attrition occurred in the Senior sample. This sample was tested at Time 1 (November) and six months later at Time 2 (April) prior to graduation. Perhaps their lack of interest in participating at Time 2 was a function of their impending graduation.

The attrition in the sample at Time 2 raises the question as to whether or not the samples are equivalent relative to the variables in this study. Accordingly, at each class level and for each sex, using Time 1 data, a t-test comparison was made of the differences between the means for eleven variables for the returners and the non-returners. The means and standard deviations are reported in Appendix A, Table 1. In only two instances of 110

possible comparisons was there a significant difference between students who returned and those who failed to return for Time 2 testing. Thus, there is no basis to assume that selective attrition occurred with respect to these variables.

Question 1: Gender

How does CDM vary between men and women?

To investigate this question we performed a 2 x 4 ANOVA with 4 class levels and both sexes. A hierarchical ANOVA was used in which the variance for class was tested first and then only the variance for gender which was not accounted for by class was tested. Table 2 presents the means of those variables for which significant differences between men and women were found. The ANOVA source tables for these variables are contained in Appendix A, Tables 2-10. Significant differences between men and women were found on nine of the 13 variables. Of the three decision-making style scales, Rational, Intuitive and Dependent, women were significantly higher on the Rational style; while there were no differences between men and women on the Intuitive and Dependent styles. Of the three decision-making task scales, College, Major, and Occupation, women were significantly higher on the College scale (DMT-C); while there were no differences between men and women on the Major and Occupation scales. Thus, regardless of class level, women are more advanced in their adjustment to college than men, and women rely more on a rational decision-making style than men.

Significant differences were also found for the other two cognitive style variables. Women are less cognitively complex than men in their ratings of the 12 occupations on the Cognitive Differentiation Grid (GRID). (Higher scores indicate less complexity.) On the other hand women were rated as having a higher Conceptual Level (CL) than men on the Paragraph Completion Method.

As expected, there were significant differences on the sex role variables. Women were more liberal in their views about the sex role appropriate behavior of women (AWS) and of men (AMTS). Regarding their self-ascribed sex role characteristics, women were

more feminine (BSRI-F) and less masculine (BSRI-M) than men, and women were more androgynous (BSRI-A) than men.

Question 2: How Does CDM Vary According to Class Level?

To investigate this question we performed a 2 x 4 ANOVA with both sexes and the four class levels. A hierarchical ANOVA was used in which the variance for gender was tested first and then only the variance for class which was not accounted for by gender was tested. Table 3 presents the means of those variables for which significant differences among class levels were found. For those variables in which there was also a significant effect for gender, the means are reported separately for men and women, and for the total sample. The ANOVA source tables for these variables are contained in Appendix A, Tables 11-19.

Significant differences among the classes were found on nine of the 13 variables. Post hoc Sheffe tests were used to determine where the significant differences occurred.

Significant class level differences were found for the three decision-making style scales. For the Rational style, Freshmen men were significantly higher than Sophomores, Juniors, and Seniors. For women, Freshmen were significantly higher than Juniors, and Sophomores were significantly higher than Seniors. For both men and women the means for the Rational style consistently decrease as class level increases. For the Intuitive style, Seniors were significantly higher than Freshmen and Juniors. Finally, for the Dependent style, Freshmen were significantly lower than Sophomores and Juniors. This pattern of means for the style scales is presented in Figure 5.

Significant differences were found across class levels for the three decision-making task scales. For College, Senior men were significantly higher than Freshmen men, while no significant difference was found for women. For the Major scale, Freshmen were significantly lower than Sophomores, Juniors, and Seniors. Similarly, for the Occupation scale, Freshmen were significantly lower than Sophomores, Juniors, and Seniors; in addition, Sophomores were significantly lower than Seniors. This pattern of means is plotted

in Figures 6a and 6b. As expected, the scores for the decision-making task scales increase as class level increases. One exception to this is the decrease from Junior to Senior on the Major scale. One interpretation of this decrease may be that for Seniors, the Major scale may be no longer relevant; that is, they may be well into the implementation phase, whereas, the Occupation scale is still relevant, since they have not yet implemented an occupational choice.

For Conceptual Level significant differences were found across class levels. For men, Freshmen were significantly lower than Juniors and Seniors. For women, Freshmen were significantly lower than Sophomores, Juniors and Seniors. In general, Conceptual Level increases as class level increases, except for Senior females, while the latter still are significantly higher than Freshmen females.

On the Attitudes toward Women scale, for both women and men, Freshmen were significantly lower than Juniors and Seniors, and Sophomores were significantly lower than Seniors. On the Attitudes Toward Masculinity scale, for men, Freshmen were significantly lower than Seniors and for women, Sophomores were significantly lower than Juniors and Seniors. Thus, with only one exception (AMTS Sophomore women) for both scales and for both men and women, students attitudes toward the sex role appropriate behavior of men and women became more liberal as class level increases.

Question 3: Time

How does CDM vary across time?

This question addresses the changes that have occurred from Time 1 to Time 2. To examine this question we computed t-tests for each variable, within each class and for the total sample. Table 4 contains the means for those variables found to be significant.[1]

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[1]The reader should note that there was no Time 2 Conceptual Level data available. Time 1 analyses with regard to the major thesis of this research (Question 10) revealed that CL was not a significant predictor.

For the total sample, significant changes were found for eight of the 12 variables. Overall, students became more Intuitive and Dependent in decision-making style; showed greater progress on the College and Occupation decision-making task scales; became less cognitively complex; and regarding sex roles, they became less androgynous and more liberal in their attitudes toward men's and women's roles.

By examining Table 4 by rows, it can be seen which class showed the greatest change on each variable. On the three decision-making style scales, Freshmen decreased on the Rational scale and increased on the Dependent scale, while Juniors increased on the Intuitive scale. For the three decision-making task scales, Juniors increased on the College scale, while Freshmen increased on Major and Occupation, and Sophomores increased on Occupation. On the Masculinity scale Sophomores increased, while Seniors decreased, and the Seniors also decreased on the Femininity scale. Finally, the most consistent findings across class levels were the increases in liberal attitudes toward women's and men's roles.

As noted in the footnote to Table 4, the table contains the 12 month time-lag, Freshmen sample, not the 5 month time-lag Freshman sample. There were no significant changes for the 5 month sample on any of the 12 variables. Yet, Table 4 indicates that for the 12 month sample, the Freshmen changed significantly on six of the 12 variables. Thus, while there were no significant changes after one semester in college, there were a number of changes after one year. In fact, of the four classes, the 12 month Freshmen showed the greatest number of significant changes.

In the analysis of research question 1, a number of significant differences were found in Time 1 data for Gender, which were not due to class level. Accordingly, we have examined the Time 1 to Time 2 changes within each class separately for men and women. Table 5 contains the data for men and Table 6 for women.

Consequently, although Time 2 CL data was collected, it was not scored. The costs in terms of the inordinate amount of person-hours to score the data clearly outweighed the benefits of having Time 2 CL data.

Comparing men and women on the three Style scales, the overall increase on the Intuitive style was significant for women but not for men. For women the largest increase occurred during the Freshman year, while for men, it occurred during the Junior year. For the Dependent style, there was no significant increase overall for men or for women. Yet, both men and women became significantly more dependent during the Freshman year.

For the decision-making task scale of College, no increases were found for men, while increases were found for women during the Sophomore and Senior years. For Major, women showed no increases, while men had an overall increase, as well as a significant increase during the Junior year. On Occupation, women increased only during the Sophomore year, while men increased overall, as well as during the Sophomore and Junior years. In summary, on the College scale, women increased, although not consistently across the four class levels, while men did not increase at any class level. With regard to Major and Occupation, however, men increase overall, but women do not.

Regarding cognitive complexity, men do not change significantly; whereas, women become less cognitively complex during the Sophomore year.

For the sex role instruments, the changes for each sex are consistent with those of the combined sample reported in Table 4, with one exception. Women did not increase in AWS scores, while men did. Thus, the significant increases in the combined sample are due to changes in men. In Question 1, it was reported that women have higher AWS scores than men. Thus, women being initially high on AWS may have accounted for their lack of increase in AWS over time.

In summary, a number of CDM changes occurred across time. The changes found for the decision-making task scales and for the AWS and AMTS were for the most part expected. The increases in the Intuitive and Dependent styles, however, were not expected; nor were the decreases in the masculinity and femininity scales during the senior year. We shall return to these results in the Discussion Chapter.

Question 4: Time by Class

What CDM variations found at each class level

are not attributable to CDM development?

To understand this question, the reader is referred to Figure 1, which presents the overlapping-longitudinal design. This question addresses the respective classes initially tested at Time 1 versus re-tested at Time 2; i.e., the vertical, broken arrows in Figure 1.

To examine this question, we computed t-tests of the Time 1 versus Time 2 data. There were 36 t-tests computed (12 variables x 3 comparisons). Table 7 presents the means for the variables for which significant differences were found. Of the 36 t-tests, only four were significant, which could well have occurred by chance. Nevertheless, three of the four differences involved the AMTS. Consistently, the re-tested samples scored higher than their respective initially tested samples. Thus students at Time 2 (Fall, 1977) were more liberal toward the sex role appropriate behavior of men than at Time 1 (Fall, 1976). One interpretation of this finding is that these changes reflect the men's liberation movement activities on college campuses during the 1976-77 academic year. One would expect similar changes on the BSRI scales, however, if this interpretation were correct. A more likely interpretation is that these results reflect an "instrumentation effect." That is, having taken the instrument once results in less stereotypic responses upon retesting. As was noted in the instrumentation section, the AMTS is a new instrument, and little is known about its psychometric properties, so that this finding and its interpretation bears further study.

In any event, the overall results for Question 4 indicate that the class level differences found in Question 2 may be regarded as developmental changes, rather than due to sampling bias as a result of differential attrition. This interpretation is further supported by the analysis reported earlier that no significant differences were found at Time 1 between those who returned and those who did not return for Time 2 testing.

Question 5: University

How stable are CDM variations across different universities?

This question addresses whether there are variations between the SIU sample and the non-SIU sample within each class level on the CDM variables of the decision-making process (DMT-C, DMT-M, and DMT-O); decisional status with regard to major (DS-M) and with regard to occupation (DS-O); and male-dominance index for major (MDI-M) and for occupation (MDI-O).

To investigate Question 5, we performed a 2 x 4 ANOVA with two levels of school (SIU and non-SIU) and four class levels. A hierarchical ANOVA was used in which the variance for class was tested first and then only the variance for school, which was not accounted for by class was tested.

For the three decision-making task scales (DMT-C, DMT-M, DMT-O) and for the two decisional status variables (DS-M, DS-O), there were no differences between the SIU and non-SIU samples. The ANOVA tables for these results are presented in Appendix A, Tables 20-24.

When using the male-dominance index criterion, however, a significant difference was found for school on Major (MDI-M) (see Table 8), but not on Occupation (MDI-O) (see Table 9). For Major, there was also a significant class by school interaction. The means for MDI-M are presented in Table 10. Figure 7 graphically presents these data. For men, SIU had overall higher MDI scores, except for the reversal with Sophomores. For women, SIU also had overall higher MDI-M scores, except for the reversal at the Senior year. While these interaction effects are not interpretable, the overall higher MDI-M scores for SIU may be. In contrast to the non-SIU schools, SIU has a School of Technical Careers, offering both associate and bachelor degrees. Thus, there is a greater number of male-dominant majors at SIU than at the non-SIU schools.

The following summarizes the results for Question 5. For the CDM variables of DMT-C, DMT-M, DMT-O, DS-M, DS-O, and MDI-O, there were no differences between the SIU sample and the non-SIU sample. Only for MDI-M were school differences found, an interpretation for which has been suggested. Thus, the results can be said to generalize beyond a single school (SIU), and perhaps to similar four-year institutions as those comprising the non-SIU sample. The generalizability of these results is further supported

when one considers the variety of sampling procedures used across the five universities.

Question 6: Sex Role Attitudes

To what extent does perception of self as masculine, feminine, or androgynous influence one's beliefs about the sex role appropriate behavior of men and women?

This question was examined using a stepwise multiple regression procedure, in which the variables were entered into the equation according to the degree to which they were theoretically posited to influence attitudes toward the role-appropriate behavior of men and women. The influence of gender, by itself, was determined by entering it first. To what extent gender is modified by BSRI-M was determined by entering it into the equation after gender; and likewise the modification due to BSRI-F and BSRI-A were determined by subsequently entering them into the equation in that order. This stepwise procedure was carried out twice with the AWS and with the AMTS as the criterion variables. A correlation matrix showing the relationship among the variables is presented in Table 11. The degree of influence of these variables on AWS and AMTS is reported in Tables 12 and 13 respectively.

Table 12 indicates that the total amount of variance in AWS accounted for by the predictor variables was .1597 ($p < .01$). Of this amount, however, gender alone accounted for .1549 of the variance in AWS. Table 13 indicates that the total amount of variance accounted for was .0853 ($p > .05$). Thus, while gender significantly predicts AWS, it does not predict AMTS. The BSRI scales, while significantly correlated with AWS and AMTS, as seen in Table 11, do not add to the prediction over and above the effects of gender.

To summarize the results for Question 6, gender predicts attitudes towards women's roles, but not men's roles. While the sex role attitudes are significantly related to one another, they do not add to the prediction of the role appropriate behavior of men or women beyond that predicted by gender. In addition, these results question the theoretical assumption that self-ascribed sex role characteristics influence other-ascribed sex roles.

Question 7: Cognitive Styles

What are the relationships among the different measures of cognitive style?

It was expected that the different measures of cognitive style would be highly correlated with one another. Thus, students who were high in cognitive complexity were expected to be also high in conceptual level and high on the rational style of decision-making, but low on the intuitive and dependent styles. Table 14 presents the intercorrelations among the measures of cognitive style. It can be seen that cognitive complexity is not highly correlated with conceptual level, nor with the rational decision-making style. Overall, the majority of the inter-correlations are relatively low. Thus, while these measures are theoretically considered measures of cognitive style, they are each measuring different constructs. Apparently, cognitive style is a multi-dimensional phenomenon.

Question 8: Gender-Dominant Majors and Occupations

How does choice of gender-dominant majors and occupations vary according to gender sex role attitudes and cognitive styles?

Two methods of analysis were used to examine this question: Path analysis and multiple regression analysis. The theoretical significance of this question is addressed by a path analysis. That is, it answers the question, "What variables directly or indirectly predict students' current choices of major and occupation?" The practical significance of this research, however, is not addressed by a path analysis. That is, if we assume that the purpose of some form of intervention (e.g., educational programs or counseling) is to expand the career options of men and women so that non-traditional careers are considered as viable alternatives, a different question must be addressed: "What variables that are potentially amenable to modification constrict students' career options, and what is the degree of influence of these variables?" To answer this question, a step-wise regression analysis was performed in which gender was forced to enter the predictive equation last and the other potentially modifiable variables were allowed to

enter the equation according to the degree of variance in the criterion each accounted for.

The path analysis procedure (Kerlinger and Pedhazur, 1973) provides a method for inferring direct or indirect causal relationships among a set of variables. In the path analysis, the zero-order correlations between any two variables are decomposed into path coefficients. The path coefficients indicate the direct effect that a specific path has on a particular variable when all other paths to that variable are statistically controlled. Path analysis may be said to occur in three steps. First, a specific model to explain the causal relationships among the variables must be hypothesized. Figure 8 represents the hypothesized model in this research. Second, the path coefficients are calculated. Third, the model is trimmed to achieve the most parsimonious model consistent with the observed data. Trimming of a causal model occurs when specific paths are deleted because their path coefficients do not indicate a direct influence. In this investigation, path coefficients were judged to be lacking in psychological significance if they failed to explain at least 1% of the variance.

Table 15 presents the intercorrelation matrix for all of the variables. The bottom row contains the correlations for each variable with the male dominance index score for Major (MDI-M). The correlation of -.49 means that women tend to have lower MDI-M scores and men higher scores. Similarly, students who score high on the femininity scale (BSRI-F) tend to have lower MDI-M scores ($r = -.41$). These correlations, however, represent a complex relationship of each variable with the male dominance index due to the intercorrelation among the variables. One needs to interpret the path coefficients to determine the unique or direct effect that a specific path has on a particular variable when all other paths to that variable are statistically controlled. Figure 9 presents the trimmed path model for Major. Figure 9 can be compared to Figure 8, the full model, to determine which paths have dropped out, since they did not directly influence the male dominance index. The size of the path coefficients relative to each other indicates the degree of importance of the variable in directly influencing the male dominance index.

We can interpret Figure 9 as follows: Path E

(other possible variables not included in the study) has a path coefficient of .82. Thus, 67% ($.82^2$) of the variance in male dominance index is unexplained by the variables in this model.

The next step is to note the paths leading to MDI-M. Four of the seven predictors in the full model had meaningful path coefficients. Only Gender and the three feminine-related scales, AWS, BSRI-F, and GRID-F have a direct influence on the male dominance index for Major. Comparing the relative size of the path coefficients leading to MDI-M, it is clear that Gender was the most important (-.43), i.e., women tend to choose majors that are more female dominant and men tend to choose majors that are more male dominant. In addition to the influence of Gender, the degree to which men and women attribute typically feminine qualities to themselves (BSRI-F, -.24) influences their choice of more female-dominant majors. Conversely, men and women with liberal views about the role-appropriate behavior of women tend to choose majors that are more male dominant (AWS, .12). The negative coefficient (-.12) for GRID-F can be interpreted to indicate that students who were more cognitively complex in judging female-dominant occupations tended to choose more male-dominant majors. To complete the interpretation of Figure 9, the path coefficients from Gender to the sex role and cognitive complexity variables can be noted. Gender directly influences all of these variables, except AMTS and GRID-M, with the highest influence (.44) on the AWS. To summarize: Females more than males are more liberal in their attitudes toward the role-appropriate behavior of women (AWS), attribute feminine qualities to themselves (BSRI-F) but do not attribute masculine qualities to themselves (BSRI-M), and are less cognitively complex when judging female dominant occupations (GRID-F). The path coefficients between the sex-role variables are also contained in Figure 9, although no assumptions were made as to the direction of the effect.

Finally, it should be noted that whenever a full path model is trimmed, the trimmed model is empirically acceptable to the degree that it is capable of reproducing the original intercorrelation matrix. The reproduced correlations were compared with the original correlations in Table 1 and the average absolute difference between the two sets of correlations was .02. Thus, we are confident that the trimmed model is

a faithful representation of the relationships among the variables.

Table 15 and Figure 10 present the path analysis for Occupation. The trimmed path model for MDI-O differs from MDI-M in that the paths from Gender to GRID-F and from GRID-F to MDI-O were dropped because their coefficients failed to meet the criterion. The relative values of the path coefficients were quite similar, with one exception. The AWS had a higher influence on MDI-O than the BSRI-F, whereas the reverse was the case for MDI-M. When the trimmed path model for MDI-O is used in Table 15, there is again only an absolute average difference of .02 indicating that the trimmed path model for MDI-O is adequate.

The results of the path analysis for both the MDI-M and MDI-O can be summarized as follows: Gender was the most important influencer of male dominance index. In addition, the female-related sex role measures were important influencers, whereas the male-related sex role measures were not.

The stepwise multiple regression analysis with Gender restricted to entering the equation last yielded important results. Table 16 presents the regression results for both Major and Occupation. The multiple correlation with all of the variables except Gender as predictors of MDI-M is .453. The amount of variance (squared multiple correlation) accounted for in MDI-M by the first six variables is .205. An F-test indicated that this amount of variance was significant beyond the .01 level ($F = 15.057$; $df = 6, 350$). An F-test of the additional variance in MDI-M accounted for by Gender (.115) was also significant beyond the .01 level ($F = 59.022$; $df = 1, 349$). Thus, MDI-M is significantly predicted by the combined sex role variables and, above and beyond these variables, it is significantly predicted by Gender. Examination of the standardized Beta weights in Table 2 indicates the relative degree of importance among the variables in predicting MDI-M. The order of importance of the variables are Gender, BSRI-F, GRID-F, and AWS.

In the regression analysis for Occupation, GRID-M had no predictive value and was entered into the equation after Gender. For the five remaining sex role measures, the multiple correlation was .338, with the amount of variance accounted for in MDI-O being .114 ($F = 5.893$; $df = 5, 229$; $p < .01$). The additional variance in MDI-O accounted for by Gender was .122

($F = 36.408$; $df = 1, 228$; $p < .01$). Thus, as in the regression analysis for Major, the sex role attitudes taken together accounted for a significant amount of variance in MDI-O and, over and above this amount, Gender still predicted a significant amount of variance. The order of importance of the variables, however, is slightly different for Occupation than for Major, namely, Gender, AWS, BSRI-F, and GRID-F. Moreover, the total amount of variance accounted for in MDI-O is lower (23%) than in MDI-M (32%).

To summarize the findings for Question 8, the results of the two types of analysis are consistent. From the path analysis it can be seen that Gender directly and independently affects the male dominance index for Major and Occupation. In addition, the direct and independent effects of the feminine-related sex role measures are also significant.

Question 9: Holland Typology

How does choice of major and occupation classified by Holland category vary according to gender, sex role attitudes and cognitive styles?

To answer this question, students' choices of Major and Occupation were classified into one of the six Holland typologies: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. Four discriminant function analyses were performed, for Major and Occupation, separately for each sex. Table 17 summarizes these results. Significant discriminant functions were found for both males and females on Major, but only for females on Occupation.

For female choice of Major, four significant discriminant functions were found. It was decided to interpret only the first two functions. Table 18 contains the group centroids for the six Holland Categories and Table 19 contains the standardized discriminant function coefficients for the ten predictor variables.

Function I separates the Conventional group from the Investigative. From Table 19, it can be seen that the most important variables contributing to Function I are GRID, DMS-D, AMTS and CL. Function I can be described as predicting women who are low in cognitive complexity and conceptual level,

dependent in decision-making style, and conservative regarding attitudes toward men's roles. Thus, this function refers to a concrete dichotomous cognitive style, the need for structure or direction from others and conservative regarding men's roles, and is labelled: Concrete/Dependent/Conservative.

Function II separates the Realistic from the Social group. From Table 19 it can be seen that the most important variables contributing to Function II are: AMTS, DMS-D, DMS-I, and CL. Function II can be described as predicting women who are liberal regarding men's roles, dependent in decision-making style, low in the intuitive decision-making style and low in conceptual level. Similarly to Function I, Function II refers to a concrete and structure-bound cognitive style, yet differs in lack of awareness of feelings (low intuitive) and liberal attitudes towards men's roles. Function II is thus labelled: Concrete/Dependent/Liberal.

Figure 11 plots the group centroids in Table 18 on the two Discriminant Functions. This figure allows the simultaneous comparison of the similarities and differences among the six Holland categories in terms of both discriminant functions. Viewing the figure in terms of the four quadrants (A), (B), (C), (D), it can be seen that four of the six groups are in quadrant B. While these four share the characteristics of low cognitive complexity and dependent decision-making style, one group, the Realistic, differs from the other three in quadrant (B) on Function II. Thus women who choose Realistic majors (primarily male-dominant) have liberal attitudes towards men's roles. In contrast, in the off-quadrant (C), women who choose Social majors (female-dominant) are more conservative towards men's roles, are more intuitive and are more abstract in their conceptual level. The only group in quadrant (A) is the Investigative group. Thus women who choose Investigative majors (male-dominant) are liberal towards men's roles, are abstract in conceptual level, and are less intuitive in decision-making style.

We will return to these results in the discussion chapter and compare these findings with the six personality types and their respective occupational environments postulated by Holland (1973).

For males, choice of major, two significant discriminant functions were found. Table 20 presents

the group centroids and Table 21 the standardized discriminant function coefficients. Finally, Figure 12 displays the degree to which the six Holland categories can be discriminated for both functions.

Function I separates the Conventional from the Social group. Table 21 indicates that the most important variables contributing to Function I are: GRID, CL, AMTS, and DMS-R. Function I describes men who are low on cognitive complexity, low on conceptual level, conservative regarding men's roles, and low on the rational decision-making style. This description closely fits that for women and is similarly labelled: Concrete/Non-Rational/Conservative.

Function II separates the Social and Artistic from the Investigative. From Table 21 it can be seen that the important variables contributing to Function II are: BSRI-F, DMS-I, DMS-D, AMTS, and DMT-M. This function describes men who are feminine, intuitive, dependent, conservative in attitudes towards men's roles, and lacking in progress in decision-making regarding major. The function is labeled Feminine/Intuitive/Conservative.

In Figure 12, it should be noted that the negative poles of both functions are characterized by the AMTS. Thus, both Social and Investigative men have liberal attitudes towards men's roles, while Realistic and Conventional men have conservative attitudes towards men's roles. Social men are differentiated from Investigative men in that the former are more feminine and intuitive. Realistic and Conventional men are less cognitively complex and have lower conceptual level than Investigative and Social men. In can be noted in Table 20 that the Realistic group has positive group centroids for both functions. Figure 12 shows this places Realistic in quadrant B, the opposite quadrant from C, the two poles of which are identified by the AMTS. Thus we would interpret the placement of Realistic men as a function of their having the most conservative attitudes towards men's roles, rather than having the characteristics of Function II.

Table 22 contains the data for Females on Occupation. Since only one function was derived, no Figure is presented. Function I differentiates Realistic, Artistic and Investigative women from Social women. The variables contributing most to this function are: AWS, BSRI-M, CL, DMS-I, and

BSRI-F. Women high on this function have liberal attitudes towards women's roles, self-ascribe masculine characteristics, are low in conceptual level and in intuitive style and low in femininity. This function is labeled Concrete/Masculine/Liberal.

In summary, the results for Question 9 show that certain sex role attitudes and cognitive styles discriminate among the Holland categories. The descriptions of the functions will be compared to the personality type descriptions in Holland's model (1973) in the discussion chapter.

Question 10: Decisional Status

How does having made a satisfying choice of major vary according to gender, sex role attitudes, cognitive styles, and progress in the decision-making process?

Figure 13 indicates the hypothesized direction of influence among the five variables. It is expected that certain paths of influence will be stronger than others, as indicated by the bold arrows in Figure 13. The decision-making process will have the strongest influence on decisional status. The other variables will have an indirect influence on decisional status via their influence on the decision-making process. Cognitive styles are expected to directly influence the decision-making process, while sex role attitudes are expected to influence the decision-making process primarily via their influence on cognitive styles. Finally, gender is expected to have less of an influence on cognitive styles than on sex role attitudes.

A correlation matrix of all scales was computed separately for males and females. A comparison between the 78 unique correlations in each matrix showed only 3 to be significantly different. Thus, the data for males and females were combined. Although there may be differences between sexes in absolute magnitude on the scales, such differences will not affect the path analysis, which is based on the pattern of intercorrelations.

There is a problem associated with the analysis of the causal path model depicted in Figure 1. Sex role attitudes and cognitive styles are measured by more than one instrument. While this enhances the

generalizability of the constructs, it compounds the number of relationships possible. If each scale is taken as an independent measure of its associated construct, the number of possible causal models is 6 (measures of sex role attitudes) X 5 (measures of cognitive styles), or 30 models. Due to the low intercorrelations found among the respective measures of a construct, the use of composite scores or simplifcation by factor analysis was not feasible. Consequently, all 30 models were constructed and analyzed.

An examination of the path coefficients involved in the 30 models revealed that the path coefficients for two cognitive-style scales (GRID and PCM) and two sex role attitude scales (BSRI-F and AWS) were rarely significant. Consequently, these scales were dropped from further analysis, which reduced the number of possible causal models from 30 to 12. The significant path coefficients associated with the remaining 12 models are presented in Table 23.

Table 23 is constructed to coincide with the hypothesized full model in Figure 13. In Figure 13, decisional status has three paths leading to it. In Table 23, the three columns under decisional status represent these three paths to decisional status. The 12 full path models can be further reduced to five groups of trimmed models, or model sets, based on similar path coefficients. In reducing the 12 path models to five model sets, two path coefficients were dropped because they were barely statistically significant, and due to the large sample size the possibility of a Type I error is large. Moreover, this line of influence was inconsistent with the bulk of the findings.

Figure 14 presents one of the 12 full hypothesized causal models with the path coefficients and zero-order correlations inserted. The interpretation of Figure 14 can begin from right to left. The path coefficient from E4 (exogenous variable 4) to decisional status shows that residual, or unmeasured, variables have a high influence on decisional status. In fact, 69% ($.83^2$) of the variance in decisional status is unexplained by the variables in the model. Most of the explained variance in decisional status is due to the direct influence of DMT-M. The two path coefficients to decisional status from BSRI-A and DMS-I are not significant, indicating their

significant correlations with decisional status are mainly due to indirect effects. In other words, BSRI-A and DMS-I have no direct effect on decisional status. They do, however, affect decisional status indirectly through their influence on DMT-M, which in turn influences decisional status. The path coefficient from E3 to DMT-M indicates that only about 4% of the variance ($1 - .98^2$) in DMT-M can be explained by both the BSRI-A and the DMS-I scale. It is interesting to note that the path coefficient from DMS-I to DMT-M is larger than the correlation. This indicates that BSRI-A may also be operating as a suppressor variable since BSRI-A correlates .19 with DMS-I and -.13 with DMT-M.

The path coefficient leading to DMS-I show that BSRI-A has a direct influence on DMS-I, while gender (male = 1, female = 2) has only an indirect influence on DMS-I, v.a the influence of BSRI-A on DMS-I. Again, the unexpected variance remaining in DMS-I is large (96%). Since there is only one hypothesized endogenous path influencing BSRI-A, there cannot be any indirect effects. Consequently, the path coefficient is equal to the correlation. Because the path coefficient is large, 22% of the variance in BSRI-A is due to the direct influence of gender. Deletion of all paths with nonsignificant coefficients in this full model results in the trimmed path model number 7 in Table 23.

Figure 15 represents the trimmed path diagrams associated with the five model sets in Table 23 and allows some summarization of the overall results. First, in all five model sets, gender influences sex role attitudes but not cognitive styles. There were no other direct effects of gender in any of the path analyses. The possibility of direct paths from gender to DMT-M and to decisional status was examined, although these paths were not originally hypothesized. In none of the 30 models were either of these two path coefficients significant. Second, it should be noted that in all cases, both sex role attitudes and cognitive styles have a direct influence on DMT-M. Third, DMT-M consistently influences decisional status.

The path diagram presented in Figure 16 represents our interpretation of the results relevant to our original hypothesis. In the present research, the failure to confirm some of the theo-

retical predictions may be the result of an incorrect theory of the use of invalid measures of the constructs. Since several measures of some constructs were used, the degree of confidence in the generalizability of the theory can be assessed. The bold arrows in Figure 16 represent strong confidence that the paths from gender to sex role attitudes and from decision-making process to decisional status indicate genuine causal relationships that are largely independent of specific measures of sex role attitudes and cognitive style. These two paths occurred in all 30 models. The unbroken arrows in Figure 16 represent a moderate degree of confidence that sex role attitudes and cognitive styles have some direct influence on the decision-making process. These paths occur in all 12 of the tabled models and in 20 and 18 of the 30 possible models, respectively. In all cases the path coefficients, while significant, are low. Thus we would predict that both sex role attitudes and cognitive styles will show a small but real direct influence on the decision-making process when particular measures of these constructs are used. The broken arrows represent a lower degree of confidence in the stability of these paths in the model. The direct effects of sex role attitudes on cognitive styles, of sex role attitudes on the decision-making process, and of cognitive styles on the decision-making process occurred only 5, 5, and 4 times, respectively, in the 12 tabled models, and 13, 7, and 6 times, respectively, in all 30 models. Again, the significant path coefficients were low. We believe that these direct effects will be measurable only occasionally; consequently, they assume less importance in the substantiation of our original hypothesized model.

The following is a summary of these results for Question 10. About one-third of the variance in decisional status was accounted for by the variables in this study. The path analysis revealed that a student's progress in the decision-making process accounts for the greatest amount of the predictable variance in decisional status. To a lesser extent, the decision-making process is influenced by decision-making style and sex role attitudes. Although gender does not influence decision-making styles, it exerts a strong influence on sex role attitudes.

The bold arrow in Figure 16 between DMT-M and

decisional status represents the strongest finding in this study. As students progress through the stages of exploration, crystallization, choice, and clarification, they are more likely to have made a satisfying choice of major. This finding supports the theoretical model of decision-making postulated by Tiedeman and O'Hara (1963) and strengthens the existing evidence of the construct validity of the DMT-M scale of the ACDM.

Of the cognitive-style variables, the ACDM Decision-Making Style scales exerted the strongest influence on progress in the decision-making process. The rational style of decision-making was found to be more effective than the intuitive and dependent styles, which were inversely related to progress. This suggests that being more systematic and taking responsibility for decisions aids progress in the decision-making process.

Of the sex role attitudes measured in the study, the BSRI masculine scale (BSRI-M) and the two androgyny scales (BSRI-A, BSRI-X), consistently influenced progress in the decision-making process. Bem's t-score method of calculating androgyny (BSRI-A) resulted in negative path coefficients, whereas the 4-point ordinal classification of androgyny (BSRI-X) and the BSRI-M scale resulted in positive path coefficients. Without the data provided by BSRI-X, one would conclude that students classified as instrumental (BSRI-M) are more advanced in the decision-making process than students classified as either expressive (BSRI-F) or androgynous (BSRI-A). The BSRI-X data, however, support the conclusion that androgyny is also related to progress in the decision-making process.

Finally, the bold arrow in Figure 16 between gender and sex role attitudes indicates that female students are more likely than male students to receive a low instrumentality score on the BSRI-M and high scores on the BSRI-A and AMTS. The females receive only slightly higher scores on the BSRI-X.

The above path analysis procedure was based on correlational analyses of Time 1 data. Such an analysis requires that an assumption about the direction of causality among the variables be made, based upon prior theoretical considerations. An additional assumption of path analysis is that any variable outside the investigated variables is not correlated with more than one of the path variables. This elim-

inated by prior assumption the third variable hypothesis which plagues correlational studies.

By analyzing the data collected from the same subjects at Time 1 and at Time 2, we can make much more definitive statements about causality. Thus, we re-examined the causal relationships among the variables involved in Question 10 employing a cross-lagged panel analysis. Cross-lagged panel analysis (CLPA) requires neither an a priori assumption of directionality, nor the assumption of no third variable effect. CLPA is, in fact, a test for the third variable effect or "spuriousness" (Kenny, 1975). If the hypothesis of a spurious relationship between two variables is rejected by CLPA, then the direction of causality can be determined a posteriori by the differences in size of the cross-lagged correlations. In this manner, CLPA provides a more empirical examination of the causal relationships among sex role attitudes, cognitive style, the decision-making process, and choosing a college major.

Two major questions concerning the causal relationships among these variables are addressed. First, do the sex role attitude and cognitive style variables influence career progress (i.e., career decision-making process and choice of major) as most theorists and researchers assume? Or is it the case that the relationship often found between these two variables is due to the influence of changes in one's career progress on one's sex role attitudes and cognitive style? The second question involves the causal ordering between the sex role attitudes and cognitive style. Do sex role attitudes influence cognitive style or does one's cognitive style affect one's sex role attitude?

The subjects for this analysis were those who returned for retesting at Time 2. The distribution by class and sex for all four class levels at both testing sessions is given in Table 1. The overall rate of participation was 64%.

For this analysis, the decisional status criterion was redefined from a two-group criterion to a three-group criterion to allow greater differentiation on decisional status. Group I consisted of those individuals who had not made a choice of major. Group II included those individuals who had made a choice of major but who indicated they were not highly satisfied with the choice (i.e., rated their satisfaction

as < 6 on a 9-point scale where 1 = Dissatisfied and 9 = Satisfied). Group III consisted of those individuals who had made a choice of major and who also indicated that they were highly satisfied (i.e., rated satisfaction as > 7 on a 9-point scale) with their choice.

Among the first developers of CLPA as a method for inferring causal patterns in longitudinal data were Campbell and Stanley (1973). A more complete presentation can be found in Kenny (1975), while Calsyn (1976) presents useful guidelines for interpreting CLPA. Figure 17 depicts a cross-lagged panel diagram. The correlations $r_{x_1x_2}$ and $r_{y_1y_2}$ are called autocorrelations and represent the test-retest correlations for x and y, respectively. The correlations $r_{x_1y_1}$ and $r_{x_2y_2}$ are called synchronous correlations. CLPA assumes that x_1 and y_1 are measured at the same time (Time 1) and x_2 and y_2 are measured at the same time (Time 2). This is called the assumption of synchronicity (Kenny, 1975). Correlations $r_{x_1y_2}$ and $r_{x_2y_1}$ are the cross-lagged correlations. When certain assumptions concerning the synchronous correlations are met, the difference between the cross-lagged correlations will indicate whether x is "causally predominent" over y or y is "causally predominant" over x. The term "causally predominent" indicates that the one variable is a stronger cause of the other variable, although the other variable may be exerting a weaker reciprocal causal influence. In rare instances where the cross-lags would be nearly equal but opposite in sign, then the existence of a negative feedback system is probably the appropriate interpretation (Calsyn, 1976). As an increase in x causes increases in y, an increase in y also causes decreases in x. A negative feedback system promotes stability in the system.

Causal inference from CLPA critically assumes that the causal determinants of x and y remain the same at both Time 1 and Time 2. Kenny (1975) refers to this as the assumption of stationarity. Only if the assumption of stationarity and synchronicity are met do differences between the cross-lagged correlations rule out the third-variable effect and indicate a causal relationship. Significant differences ($p < .05$) between cross-lagged correlations were

determined by a Pearson-Filon z-test for correlated correlations (Kenny, 1978). Kenny and Calsyn discuss a number of ways to test whether the assumptions of synchronicity and stationarity have been met. For a thorough discussion, the reader is referred to this work. Only the cross-lag panels meeting both of these assumptions are discussed.

CLPA is designed to err in the direction of failing to find a significant causal effect (Type II error) rather than mistakenly identifying spuriousness as a causal effect (Type I error). Consequently, both Kenny (1975) and Calsyn (1976) recommended using different samples and different time lags. In the present analysis, we have chosen to examine the data by analyzing each class sample with the data for the sexes combined. For these five independent analyses, the effect for sex was statistically partialled out. Some of the sample sizes were too small (N = 24) to perform a CLPA individually on each class and gender. Each independent panel analysis examined all possible panel pairs (55) from the eleven variables under investigation.

As in any longitudinal study, attrition is a problem. Both Kenny (1975) and Calsyn (1976) recommend using only those subjects who have complete data at both times. While this restricts the generalizability of the reported results, an estimation can be made of how similar the students who completed the project are to those students not completing the project. At each class level and for each sex, a t-test ($p < .05$) comparison was made of the differences between the returners and non-returners on all eleven variables. Significant differences were observed in only two of 110 comparisons, thus indicating that the attrition can be assumed to be due to factors other than the variables under investigation in this study.

Table 24 summarizes the panel comparisons in those samples meeting the assumption of stationarity. Only the sophomore sample (N = 86) failed to meet this assumption. The left-hand column of Table 24 denotes the pair of variables found to have a causal relationship. The direction of the causal effect is represented by the direction of the arrows which appear in the column beneath the sample(s) in which that cross-lag comparison was statistically significant. An arrow with a plus sign indicates a simple

causal relationship. Thus, in Table 24 the first arrow under the freshman (5 mo.) indicates that for this sample, an increase in progress through the decision-making process towards choosing a college major causes an increase in the endorsement of BSRI masculine qualities. An arrow with a minus sign shows that an increase in one variable causes a decrease in the other variable. For example, the first negative arrow under freshmen who were tested at a 12-month interval signifies that an increase in decisional status from Time 1 to Time 2 causes a decrease in the use of the intuitive decision-making style at Time 2. The double arrow under the freshman sample (5 mo.) represents a negative feedback situation. An increase in the decision-making process causes an increase in the self-ascription as androgynous. However, the negative sign arrow signifies that this increase in androgynous characteristics from Time 1 to Time 2 causes a corresponding decrease in the decision-making process. Thus, there is a tendency for these two variables to reach a state of dynamic equilibrium.

The first question we raised earlier concerns the direction of causality between decision-making progress and sex role attitudes, and cognitive styles. In Table 2 there are four instances of the causal predominance of decision-making progress influencing sex role and cognitive style rather than vice versa, and only one instance when a sex role attitude influences the decision-making process. For juniors, making a satisfying choice of major (DS) causes an increase in their endorsement of sex role self concept as masculine (BSRI-M). In a similar manner, progressing through the psychological decision-making stages (DMT-M) is also causally related to an increase in the self-ascription of masculinity for freshmen (5 mo.). Moreover, we find that progression through the decision-making process also produces an increase in the androgynous (BSRI-X) self-concept for the five-month freshman sample. However, as stated previously, this particular relationship also shows the reciprocal causal effect of increases of androgyny decreasing the decision-making process. These findings suggest, for freshmen and somewhat for juniors, that decision-making progress and making satisfying choices of major causes students to change their view of themselves to include

a stronger emphasis on androgynous or instrumental qualities. See Moreland, Gulanick, Montague, and Harren (1978) for an interpretation of masculinity (BSRI-M) as instrumentality. With the exception of one bidirectional causal relationship, changes in the sex role related aspect of the self-concept appear to follow decisive action, rather than decisive action being the result of changes in self-concept. We can reach similar conclusions about the causal relationships between decisional status, decision-making progress, and the cognitive variables. For freshmen (12 mo.), increases in both decisional status and decision-making process cause decreases in utilization of the intuitive decision-making style (DMS-I).

The second question we raised earlier concerned the direction of causality between sex role attitudes and cognitive styles. Two of these unidirectional causal relationships suggest the predominant influences of cognitive styles on sex role attitudes rather than vice versa. Surprisingly, for freshmen (12 mo.) an increase in the rational decision-making style (DMS-R) produces decreases in liberal attitudes towards sex role appropriate behavior of women (AWS). This finding was unexpected and there is no immediate apparent interpretation for it. Not so surprising is the finding that an increase in the intuitive decision-making style leads to an increase in endorsement of feminine qualities (BSRI-F) for freshmen (5 mo.). In only one instance do we see the effect of a sex role attitude on cognitive style. For seniors, an increase in their self perception as androgynous causes a decrease in their intuitive decision-making style score.

The third set of findings is not related to our original hypotheses. When examining the intra-relationships among the sex role attitudes and cognitive styles we find some interesting results. An increase in rational decision-making style causes a decrease in the intuitive style. Surprisingly, we find that for freshmen (5 mo.) an increase in liberal attitudes concerning the sex role appropriate behavior for women (AWS) increases the self-ascription of femininity (BSRI-F). Thus, self-ascription follows other-ascription and not vice versa. Moreover, for both freshmen (5 mo.) and seniors, increases in liberal attitudes concerning sex-role behavior appropriate for women causes an increase in liberal

attitudes towards sex-role appropriate behavior for men.

These results of the CLPA analysis are inconsistent with the path analysis results. Recall that in the path analysis we found that students' satisfaction with their choice of major was caused by their progress in the decision-making process. This, in turn, was causally influenced by their decision-making styles, sex role related aspects of their self-concepts, and their attitudes about the sex role appropriate behavior of men and women. These results are consistent with the bulk of the sex role and counseling literature, which suggests that as one's attitudes, self-concept, and decision-making styles become more differentiated, one is able to better progress through the stages of the decision-making process and experience greater satisfaction with one's decisions. This was the logic used in Figure 2 and as represented in the first path diagram. The results of the CLPA analysis contradicts this ordering and direction of causal influences.

In the path analysis, we used cross-sectional data to test an a priori determined model of causal relationships between sex role self-concept and attitudinal measures, cognitive style variables, and decision-making process and outcome indicators. The use of CLPA on longitudinally obtained data, however, has served to highlight the limitations of cross-sectional data in determining causal relationships. CLPA involves no a priori postulations of causal effects. Theory is required only for the selection of the variables which are to be studied. Short of laboratory controlled, experimental designs, CLPA is the most definitive approach available for determining causality among a set of variables. In fact, CLPA designs may have more external validity than laboratory experiments (Calsyn, 1976).

The findings regarding the causal predominance of the career decision variables over the attitudinal and cognitive variables have some important implications for theories of career decision-making and for counseling which will be discussed in the next chapter.

Summary of Results

In the following summary of the results from this project, only major findings are reported. For some of the findings there are exceptions which are not reported here since they have been reported earlier.

Gender Differences

Women are more advanced in their adjustment to college than men, and rely more on a rational decision-making style than men. They are less cognitively complex but have higher conceptual levels than men. Regarding sex roles, women have more liberal attitudes than men about the sex role appropriate behavior of both women and men. Regarding their sex role self-concept, women are more feminine, less masculine, and more androgynous than men.

Class Level Differences

Freshmen are more rational, less intuitive, and less dependent in decision-making style than the other classes. For the three decision-making task scores of College, Major and Occupation, scores increase as class level increases. Conceptual level increases as class level increases. Attitudes toward men's and women's sex roles became more liberal as class level increases.

Changes over Time

While a number of changes were noted at certain class levels but not at others, overall changes across the four years were the following: From Time 1 to Time 2, students became more intuitive and dependent in decision-making style, showed greater progress on the college and occupation decision-making tasks, became less cognitively complex, less androgynous, and more liberal in their attitudes towards men's and women's sex roles. These changes were for the total sample, sexes combined.

When examining the sample for men and women separately, these changes are modified as follows: the overall increase in intuitive style was significant for women, but not for men. The overall increase in dependent style was not significant when the samples were analyzed separately. The biggest increase in the dependent style occurred for both men and women during the freshman year. On the decision-making task scales, women increased on college, although not consistently across the four class levels. On the major and occupation scales, men increased overall, but women did not. The overall decrease in cognitive complexity was due primarily to women, since men did not change significantly. The results for the combined sample on the sex role variables were consistent with the separate analyses except that the increase in liberal attitudes towards women's roles is due primarily to changes in men's attitudes, since for women there was no significant increase. (Women were initially more liberal than men in attitudes towards women's roles.)

Time 1 vs. Time 2 Samples By Class

This analysis showed virtually no differences between initially tested and re-tested samples within each class. Thus, the class level differences found in Question 2 can be regarded as developmental differences.[1] While fewer significant differences were found in the longitudinal comparisons than in the cross-sectional comparisons, this is believed to be a function of sample size, with the cross-sectional samples being much larger.

SIU vs. Non-SIU Samples

These samples were compared on seven CDM variables. On six of the seven, there were no significant differences. Overall, the results do not appear to

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[1]This conclusion presumes that the influence of the college environment is not a significant factor since non-college persons were not tested. This assumption should certainly be questioned.

be sample-specific, and generalizations across universities are warranted.

Influence of Sex Role Self-Concept on Attitudes Toward the Sex Role Appropriate Behavior of Others

The basic finding here is that one's sex role self-concept does not predict one's attitudes toward men's and women's roles. This finding is consistent with that reported in Question 10 regarding the CLPA analyses of causal influences among the sex role variables. The main predictor of sex role attitudes toward women's roles was gender (women are more liberal), while attitudes towards men's roles were not significantly predicted by gender.

Relationships Among Cognitive Styles

Overall, the cognitive style measures are uncorrelated with each other. Perhaps the generic construct of "cognitive style" is too heterogeneous and specific constructs within this class need to be considered separately in their own right. These findings will be elaborated in the discussion chapter.

Choice of Gender-Dominant Majors and Occupations

The basic finding here is that one's gender significantly predicts one's choice of gender-dominant majors and occupations. Women and men clearly gravitate toward same-sex dominant fields. Nevertheless, beyond the influence of gender, feminine-related sex role attitudes and cognitive complexity predicted choice of gender-dominant fields. Students who were liberal regarding women's sex roles chose more male dominant fields; conversely, students who self-ascribed feminine characteristics chose more female dominant fields. Finally, students who were more cognitively complex where judging female dominant occupations chose more male-dominant fields. Thus, self-ascribed feminine characteristics and attitudes towards women's roles predict the gender dominance of one's choices, but masculine self-ascribed characteristics and

attitudes towards men's roles are not predictive of gender dominant choices.

Content of Choice (Holland Typology)

Regarding choice of major, women who choose Realistic majors are more liberal towards men's roles; while women who choose Social majors are more conservative towards men's roles. Women Social majors are more intuitive and abstract in conceptual level than Realistic majors. While women in Investigative majors are like women in Social majors in being abstract in conceptual level; in contrast to Social majors, Investigative majors are more like Realistic majors in that they are more liberal towards men's roles and less intuitive in decision-making style. Similarly, regarding choice of occupation, the Realistic and Social groups are the most differentiated, with Artistic and Investigative groups more similar to the Realistic group than the Social group. Women choosing Realistic, Artistic and Investigative occupations, in contract to women choosing Social occupations, are more liberal towards women's roles, self-ascribe masculine characteristics but do not self-ascribe feminine characteristics, are low in conceptual level and are low in the intuitive decision-making style.

The occupational choices of men were not predicted by any of the variables in this study; whereas their choice of major was. Men in Social and Investigative majors have liberal attitudes towards men's roles; whereas, men in Realistic and Conventional majors have conservative attitudes towards men's roles. Social and Investigative majors differ, however, in that Social majors are more feminine in sex role self-ascription and more intuitive in decision-making style. Finally, men in Realistic and Conventional majors are less cognitively complex and are lower in conceptual level than men in Investigative and Social majors.

Decisional Status (Having Made a Satisfying Choice of Major)

The results of the path analyses on cross-

sectional data are not summarized here since they are superceded by the results of the cross-lagged panel analyses on longitudinal data. The results of the CLPA provide more convincing evidence of the causal influences among the variables than the results of the path analyses.

Progress in decision-making and making satisfying choices of major cause students to become more androgynous and masculine in their self-ascription of sex role characteristics. These four decision-making variables also affect one cognitive style variable. Increases in these variables cause a decrease in the utilization of the intuitive style of decision-making. In turn, increases in the intuitive decision-making style cause increases in the self-ascription of feminine characteristics. However, increases in the Rational decision-making style cause an increase in conservative attitudes towards women's roles. Finally, an increase in one's liberal attitudes toward women's roles causes an increase in one's self-ascription of feminine qualities. This increase in liberal attitudes towards women's roles also causes an increase in liberal attitudes towards men's roles. The implications of these findings will be discussed further in the discussion chapter to follow.

Figure 4

Variable List and Scale Designations

Category	Scale Designation	Variable
Sex Roles:	BSRI-M	Bem Sex Role Inventory-Masculinity
	BSRI-F	Bem Sex Role Inventory-Femininity
	BSRI-A	Bem Sex role Inventory-Androgeny (t-score method)
	BSRI-X	Bem Sex Role Inventory-Androgeny (4-point ordinal method)
	AWS	Attitude Toward Women Scale
	AMTS	Attitude Toward Masculine Transcendence Scale
Cognitive Styles:	DMS-R	Decision-Making Style - Rational
	DMS-I	Decision-Making Style - Intuitive
	DMS-D	Decision-Making Style - Dependent
	CL	Conceptual Level
	GRID-M	Cognitive Complexity - Male Dominant Occupations
	GRID-F	Cognitive Complexity - Female Dominant Occupations
	GRID-O	Cognitive Complexity - Overall
Decision Making Process:	DMT-C	Decision-Making Task: College
	DMT-M	Decision-Making Task: Major
	DMT-O	Decision-Making Task: Occupation
Outcomes:	D.S.	Decisional Status
	MDI-M	Male Dominance Index - Major
	MDI-O	Male Dominance Index - Occupation
	Holland Typology	R (Realistic) I (Investigative) A (Artistic) S (Social) E (Enterprising) C (Conventional)

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Table 1

Distribution of Sample of Subjects by Sex, Class and University

University	Sex	Freshmen	Sophomores	Juniors	Seniors	Total
SIU-Time 1						
	M	148	67	71	66	352
	F	159	78	66	58	361
	T	307*	145	137	124	713
SIU-Time 2						
	M	102	39	46	27	214
	F	117	51	44	25	237
	T	219	90	90	52	451
Non-SIU**						
	M	47	40	45	42	174
	F	59	68	51	50	228
	T	106	108	96	92	402

*Includes samples A and A_1

**Combined samples from four universities

Table 2

Means and F-Ratios for those Variables with Significant Gender Differences (N= 1115)

Variable*	Males	Females	F	P
DMS-R	4.07	4.33	5.72	.02
DMT-C	19.92	20.39	10.31	.001
GRID	234.39	244.49	8.66	.003
CL	1.52	1.71	25.38	.000
AWS	72.89	82.71	218.87	.000
AMTS	164.10	178.98	101.29	.000
BSRI-M	5.76	4.86	53.25	.000
BSRI-F	4.61	5.09	216.66	.000
BSRI-A	-1.30	-.22	275.79	.000

*Variables not significant: DMS-I, DMS-D, DMT-M, DMT-O

Table 3

Means and F-Ratios for those Variables with Significant Class Level Differences

Variable*	Sample**	Fresh.	Soph.	Jun.	Sen.	F	P
DMS-R	T	4.64	4.29	3.91	3.61	18.48	.000
	M	4.52	3.93	3.83	3.61		
	F	4.74	4.47	3.99	3.64		
DMS-I	T	3.12	3.38	3.12	3.46	4.35	.005
DMS-D	T	2.15	2.57	2.54	2.30	5.60	.001
DMT-C	T	19.84	20.04	20.48	20.66	7.18	.000
	M	19.87	19.90	20.26	20.70		
	F	20.18	20.46	20.81	20.78		
DMT-M	T	25.70	26.19	26.67	26.28	4.45	.004
DMT-O	T	26.06	26.79	27.34	27.64	13.82	.000
CL	T	1.40	1.74	1.80	1.73	30.81	.000
	M	1.32	1.55	1.61	1.76		
	F	1.46	1.90	1.97	1.67		
AWS	T	75.35	77.37	79.56	82.57	22.11	.000
	M	69.38	73.14	73.72	78.37		
	F	80.54	81.39	84.70	86.03		
AMTS	T	170.51	168.48	172.42	178.36	7.09	.000
	M	161.56	161.85	164.82	171.86		
	F	178.36	174.72	179.77	184.30		

*Variables not significant: GRID-O, BSRI-M, BSRI-F, BSRI-A

**T = Total; M=Males; F=Females

Table 4

Means for Those Variables with Significant Differences[1] from Time 1 to Time 2 by Class and Total Sample

Variable	Freshmen[2]		Sophomores		Juniors		Seniors		Total	
	T_1	T_2	T_1	T_2	T_1	T_2	T_1	T_2	T_1	T_2
DMS-R	4.76	4.48*								
DMS-I					2.96	3.39**			3.19	3.36**
DMS-D	1.81	2.15**							1.89	2.02*
DMT-C							20.69	21.35**	20.43	20.69**
DMT-M	25.26	25.99*								
DMT-O	25.79	26.57*	26.90	27.73**					26.56	27.08**
GRID-O			242.02	266.13*					240.21	249.73**
BSRI-M			4.92	5.05**			4.97	4.69**		
BSRI-F							4.82	4.51**		
BSRI-A									-.32	-.43*
AWS	75.83	77.66*			78.40	80.21*			77.28	78.41**
AMTS	154.91	191.12**	156.75	189.92**	157.71	194.53*	164.24	197.04**	163.15	190.04**

*p < .05
**p < .01

[1]Empty cells indicate no significant difference

[2]Freshmen Sample A (12 mo. time lag)

Table 5

Means for Those Variables with Significant Differences from Time 1 to Time 2 by Class for Males

Variables	Freshmen		Sophomores		Juniors		Seniors		Total	
	T_1	T_2	T_1	T_2	T_1	T_2	T_1	T_2	T_1	T_2
DMS-R										
DMS-I					2.78	3.41**				
DMS-D	1.82	2.12*								
DMT-C										
DMT-M					26.35	27.35**			25.81	26.28*
DMT-O			26.90	27.74*	26.52	27.48*			26.39	27.03**
GRID-O										
BSRI-M			5.11	5.31**			5.25	5.00*		
BSRI-F							4.60	4.35**		
BSRI-A										
AWS	69.47	71.26*			72.78	75.57**			72.08	73.52**
AMTS	159.78	177.45**	152.69	178.41**	153.11	183.07**	163.85	193.63**	157.59	180.86**

*p < .05
**p < .01
[1]Empty cells indicate no significant difference
[2]Freshman Sample A (12 mo. time lag)

Table 6

Means for Those Variables with Significant Differences from Time 1 to Time 2 by Class for Females

Variables	Freshmen		Sophomores		Juniors		Seniors		Total	
	T_1	T_2	T_1	T_2	T_1	T_2	T_1	T_2	T_1	T_2
DMS-R										
DMS-I	3.21	3.46*							3.29	3.50**
DMS-D	1.71	1.97*								
DMS-C			20.61	21.20*			20.52	21.48*		
DMT-M										
DMT-O			26.90	27.73*						
GRID-O			237.94	272.27*						
BSRI-M							4.67	4.35*		
BSRI-F							5.06	4.68**		
BSRI-A										
AWS										
AMTS	174.72	194.66**	159.92	198.90**	162.41	206.25**	164.67	200.88**	168.21	198.38**

*p < .05
**p < .01
[1]Empty cells indicate no significant difference
[2]Freshman Sample A (12 mo. time lag)

Table 7

Comparison of Re-tested Samples at Time 2 with Initially Tested Samples of Time 1 for Each Class Level

Variable	*A_2	vs	B_1	P	B_2	vs	C_1	P	C_2	vs	D_1	P
AMTS	189.50		156.83	.000	187.81		157.50	.000	192.37		164.10	.000
DMS-I	--		--	N.S.	3.59		2.96	.001	--		--	N.S.

*A_2 vs B_1 = Re-tested Freshmen who at Time 2 were Sophomores, versus initially tested Sophomores at Time 1

B_2 vs C_1 = Re-tested Sophomores who at Time 2 were Juniors, versus initially tested Juniors at Time 1

C_2 vs D_1 = Re-tested Juniors who at Time 2 were Seniors versus initially tested Seniors at Time 1

Table 8

Male Dominance Index-Major by Sex, Class, and School

Source	d.f.	SS	MS	F	P
Sex	1	195703.25	195703.25	266.60	.000
Class	3	9242.37	3080.79	4.20	.006
School	1	6317.75	6317.75	8.61	.003
Sex x Class	3	3770.74	1256.91	2.46	.163
Sex x School	1	651.09	651.09	.89	.347
Class x School	3	8401.48	2800.49	3.82	.010
Sex x Class x School	3	4864.05	1621.35	2.21	.085
Error	1030	756089.25	734.07		

Table 9

Male Dominance Index-Occupation, by Sex, Class, and School

Source	d.f.	SS	MS	F	P
Sex	1	155551.87	155551.87	167.86	.000
Class	3	6359.56	2119.85	2.29	.077
School	1	1544.00	1544.00	1.67	.197
Sex x Class	3	4589.61	1529.87	1.65	.176
Sex x School	1	1177.63	1177.63	1.27	.260
Class x School	3	831.41	277.14	.30	.826
Sex x Class x School	3	4712.13	1570.71	1.69	.167
Error		609761.94	926.69		

Table 10

Means for Male Dominance Index-Major, by Class, Sex, and School

	Males		Females	
	SIU	Non-SIU	SIU	Non-SIU
Freshmen	78.93	74.93	55.65	43.55
Sophomores	72.26	79.50	43.22	40.76
Juniors	77.43	67.47	51.91	35.87
Seniors	75.88	69.08	47.99	55.60

Table 11

Intercorrelations for Sex Role Attitude Variables

	Sex	AWS	AMTS	BSRI-M	BSRI-F	BSRI-A
Sex	1.00000	-	-	-	-	-
AWS	0.39360	1.00000	-	-	-	-
AMTS	0.28644	0.56666	1.00000	-	-	-
BSRI-M	-0.21752	-0.02900	-0.01969	1.00000	-	-
BSRI-F	0.41695	0.17861	0.15984	0.06316	1.00000	-
BSRI-A	0.45189	0.15121	0.12449	-0.72134	0.62039	1.00000

Table 12

Multiple Regression Results Predicting Attitudes toward Women Scale

Variable	Multiple R	R^2	RSQ Change	Simple R	Beta
Sex	0.39360	0.1549	0.15492	0.39360	0.40169
BSRI-M	0.39785	0.1583	0.0034	-0.02900	0.20914
BSRI-A	0.39820	0.1586	0.0003	0.15120	0.19808
BSRI-F	0.39959	0.1597	0.0011	0.17861	-0.12497

Table 13

Multiple Regression Results Predicting Attitudes Towards Masculine Transcendence Scale

Variable	Multiple R	R^2	RSQ Change	Simple R	Beta
Sex	0.28644	0.08205	0.08205	0.28644	0.27709
BSRI-F	0.28987	0.08402	0.00198	0.15984	0.02946
BSRI-M	0.29216	0.08536	0.00133	-0.01969	0.05215
BSRI-A	0.29218	0.08537	0.00001	0.12449	0.01861

Table 14

Intercorrelations for Cognitive Style Variables

	STY R	STY I	STY D	GRID-O	CLTS
STY-R	1.00	-	-	-	-
STY-I	-0.306	1.00	-	-	-
STY-D	-0.136	0.193	1.00	-	-
GRID-O	0.089	-0.118	-0.075	1.00	-
CLTS	-0.009	0.001	0.034	-0.011	1.00

Table 15

Intercorrelation Matrix of Sex-Role Self-Concept, Sex-Role Attribution, Cognitive Complexity and the Male Dominance Indices for Major and Occupation

	Gender	AWS	AMTS	BSRI-F	BSRI-M	GRID-F	GRID-M	MDI-O
Gender		38	28	45	-29	12	05	-45
AWS	44		62	18	-12	07	01	-04
AMTS	34	61		13	-04	-01	-01	-06
BSRI-F	40	22	16		-04	10	06	-29
BSRI-M	-30	-09	-09	-02		06	16	14
GRID-F	12	05	02	13	07		46	-12
GRID-M	01	-02	00	03	16	42		-04
MDI-M	-49	-13	-13	-41	13	-20	-05	

NOTE: Correlations in the upper triangle are for those students who have made a satisfying occupational choice (N = 235). Correlations in the lower triangle are for those students who have made a satisfying choice of college major (N = 357).

Table 16

Multiple Regression Summary

Major (MDI-M) as the Criterion (N = 357)			Occupation (MDI-O) as the Criterion (N = 235)		
Variable	R Square	Beta	Variable	R Square	Beta
BSRI-F	.164	-.243	BSRI-F	.085	-.115
GRID-F	.186	-.131	BSRI-M	.102	.035
BSRI-M	.202	.008	GRID-F	.110	-.070
AMTS	.205	-.022	AWS	.111	.181
GRID-M	.205	.021	AMTS	.114	-.037
AWS	.205	.129	Gender	.236	.437
Gender	.320	.426	GRID-M	.236	.017

Table 17

Significant Discriminant Functions for Predicting Holland Code Classifications of Major and Occupation

	MALES	FEMALES
Major % correct classifications *	I, II 39%	I, II, III, IV 41%
Occupation % correct classifications	None 37%	I 52%

*Chance probability = 16.67%

Table 18

Group Centroids for Females on Major

Rank	I		II	
1	.61	Conventional	.90	Realistic
2	.40	Realistic	.16	Investigative
3	.37	Enterprising	.10	Enterprising
4	.12	Artistic	.08	Artistic
5	-.04	Social	.01	Conventional
6	-.32	Investigative	-.36	Social

Table 19

Standardized Discriminant Function Coefficients for Females on Major

	I		II	
1	.25	GRID	.44	AMTS
2	.24	DMS-D	.41	DMS-D
3	.13	DMS-I	.12	AWS
4	.05	BSRI-M	.02	BSRI-M
5	.08	BSRI-F	-.02	BSRI-F
6	-.09	AWS	-.16	GRID
7	-.25	DMS-R	-.17	DMT-M
8	-.37	DMT-M	-.29	DMS-R
9	-.53	CL	-.40	CL
10	-.65	AMTS	-.46	DMS-I

Table 20

Group Centroids for Males on Major

Rank	I		II	
1	.48	Conventional	.31	Social
2	.21	Realistic	.27	Artistic
3	-.08	Enterprising	.24	Realistic
4	-.10	Artistic	.15	Enterprising
5	-.17	Investigative	-.07	Conventional
6	-.34	Social	-.29	Investigative

Table 21

Standardized Discriminant Functions for Males on Major

	I		II	
1	.32	GRID	.43	BSRI-F
2	.02	DMT-M	.38	DMS-I
3	-.03	BSRI-F	.33	DMS-D
4	-.07	DMS-D	.28	BSRI-M
5	-.13	DMS-I	.24	AWS
6	-.20	AWS	.16	DMS-R
7	-.21	BSRI-M	-.10	CL
8	-.30	DMS-R	-.11	GRID
9	-.51	AMTS	-.31	DMT-M
10	-.63	CL	-.71	AMTS

Table 22

Group Centroids and Standardized Discriminant Function Coefficients for Females on Occupation

	Group Centroids		Discriminant Function Coefficients		
		I			
1	.64	Realistic	1	.73	AWS
2	.58	Artistic	2	.30	BSRI-M
3	.24	Investigative	3	-.05	DMS-D
4	-.01	Conventional	4	-.12	DMS-R
5	-.08	Enterprising	5	-.22	GRID
6	-.27	Social	6	-.32	AMTS
			7	-.36	DMT-O
			8	-.37	BSRI-F
			9	-.38	DMS-I
			10	-.40	CL

Table 23

Path Coefficients

		Specific paths from A to B									
		(A)	Gender	Gender	Sex role	Sex role	Cognitive style	Sex role	DMT-M	Cognitive style	Scales in path analysis	
Set	Model	(B)	Sex role	Cognitive style	Cognitive style	DMT-M	DMT-M	Decisional status	Decisional status	Decisional status	Sex role	Cognitive style
I	1		-26		17	17	13	13	54		BSRI-M	DMS-R
	2		-26		-15	17	-14	11	53		BSRI-M	DMS-I
II	3		-26			19	-14	11	51	-11	BSRI-M	DMS-D
III	4		47			-14	15	-10[a]	55		BSRI-A	DMS-R
	5		12	11[a]		15	-16		53		BSRI-X	DMS-I
	6		30			-12	-16		55		AMTS	DMS-I
IV	7		47		18	-13	-15		53		BSRI-A	DMS-I
	8		12		12	14	14		55		BSRI-X	DMS-R
	9		30		-13	-11	14		56		AMTS	DMS-R
V	10		47			-15	-14		52	-11	BSRI-A	DMS-D
	11		12			16	-15		52	-11	BSRI-X	DMS-D
	12		30			-12	-14		54	-11	AMTS	DMS-D

Note. Decimal points have been omitted. The path coefficients for any two variables can be examined by going from row (A) to row (B) for each column. Only significant coefficients are included. BSRI-M = Bem Sex-Role Inventory masculine scale; BSRI-A = androgyny scale; BSRI-X = a procedure that differentiates those who are high on both scales from those who are low on both; AMTS = Attitudes Toward Masculine-Transcendence Scale; DMS-R = rational decision-making style; DMS-I = intuitive decision-making style; DMS-D = dependent decision-making style.

[a]Values are barely statistically significant.

Table 24

Panel Comparisons

Variables Related Causally[a]	Freshmen 5 months N=98	Freshmen 12 months N=115	Juniors 12 months N=86	Seniors 5 months N=51
DS, BSRI-M			+ →	
DS, DMS-I		− →		
DMTM, BSRI-M	+ →			
DMTM, BSRI-X	+ → ← −			
DMTM, DMS-I		− →		
AWS, DMS-R		← −		
BSRI-F, DMS-I	← +			
BSRI-X, DMS-I				− →
DMS-R, DMS-I				− →
AWS, BSRI-F	+ → [b]			
AWS, AMTS	+ → [b]			+ →

Note. Only the panel comparisons with statistically different cross-lagged correlations are included.

[a] DS = decisional status; DMTM = decision-making task for college major; AWS = Attitudes Toward Women Scale; AMTS = Attitudes Toward Masculine Transcendency; BSRI-M = Bem Sex-Role Inventory masculine scale; BSRI-F = femininity scale; BSRI-X = androgeny scale; DMS-R = rational decision-making style; DMS-I = intuitive decision-making style; DMS-D = dependent decision-making style.

Figure List

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Figure 5 Decision-Making Styles Across Class Levels

Figure 6 Decision-Making Task Scales Across Class Levels

Figure 7 Male Dominance Index -- Major by Sex, Class and School

Figure 8 Full Path Model Depicting Hypothesized Relationships Among the Variables

Figure 9 Trimmed Path Model for Male Dominance Index -- Major

Figure 10 Trimmed Path Model for Male Dominance Index -- Occupation

Figure 11 Group Centroids for Females on Major

Figure 12 Group Centroids for Males on Major

Figure 13 Path Diagram Depicting Causal Relationships Between Gender, Sex role Attitudes, Cognitive Styles and Decision-Making process and Decisional Status Regarding a College Major

Figure 14 A Specific Full Hypothesized Path Model

Figure 15 Trimmed Path Models Corresponding to the Five Model Sets

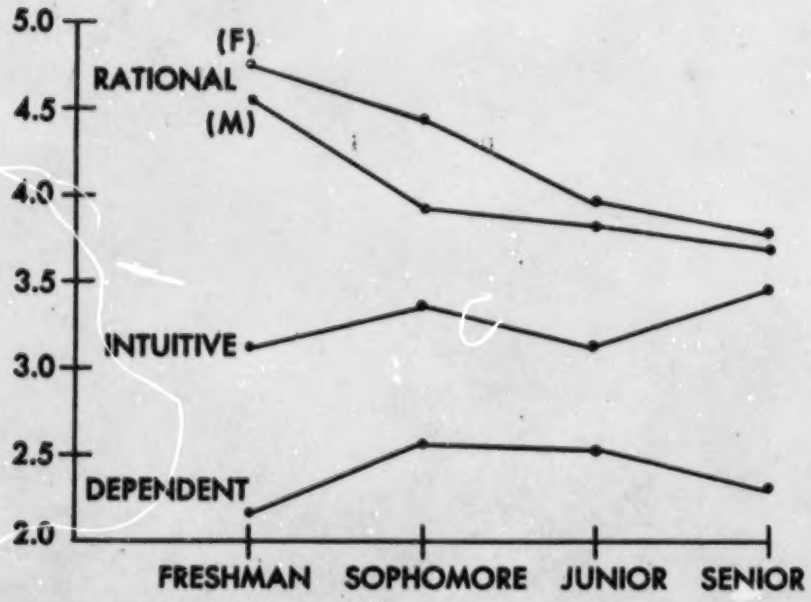

FIGURE 5

Decision-Making Styles Across Class Levels

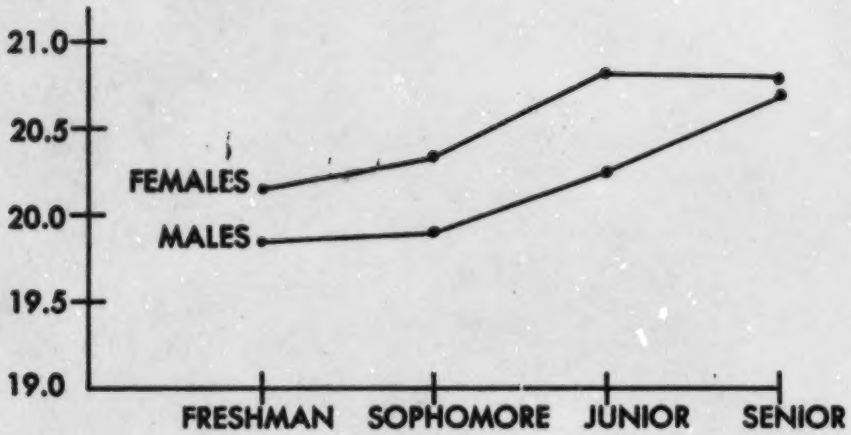

FIGURE 6A
College

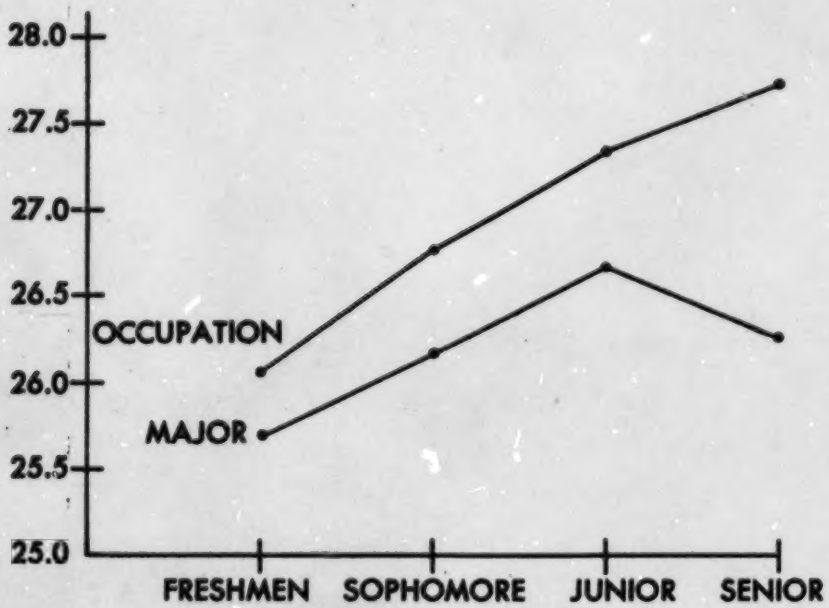

FIGURE 6B
Major and Occupation

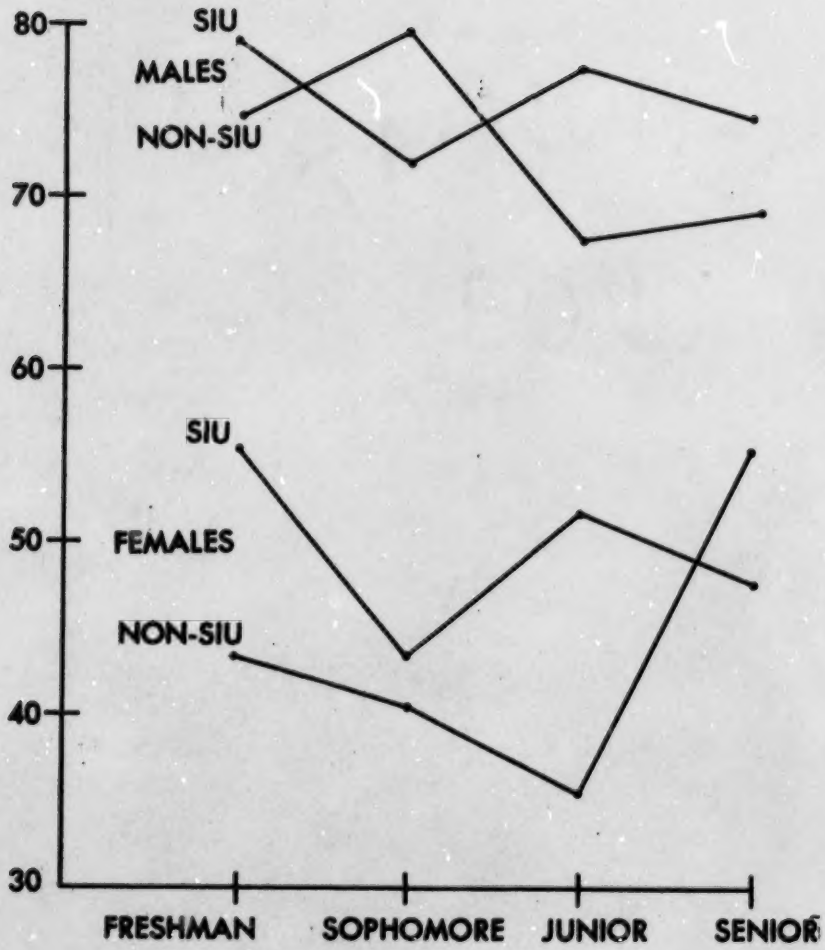

FIGURE 7

Male Dominance Index—Major, by Sex, Class and School

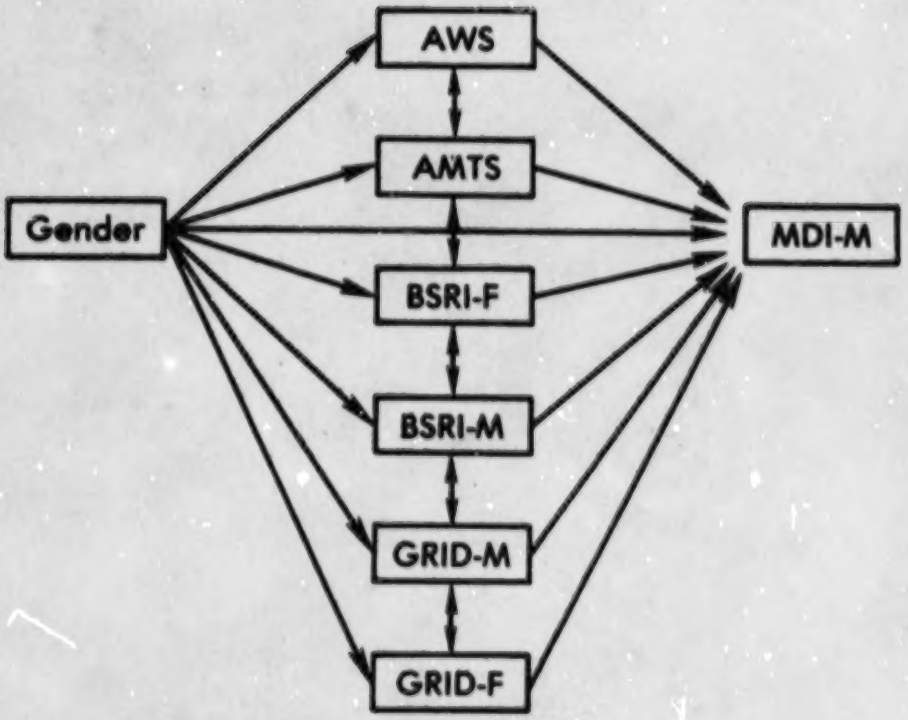

Figure 8

Full path model depicting hypothesized relationships among the variables. Legend: Gender = Male or Female; AWS = Attitude Toward Women Scale; AMTS = Attitude Toward Masculine Transcendence Scale; BSRI-F = Bem Sex Role Inventory-Femininity Scale; BSRI-M = Bem Sex Role Inventory-Masculinity Scale; GRID-M = Cognitive Differentiation GRID-Male Dominant Occupations; GRID-F = Cognitive Differentiation GRID-Female Dominant Occupations; MDI-M = Male Dominant Index-Major.

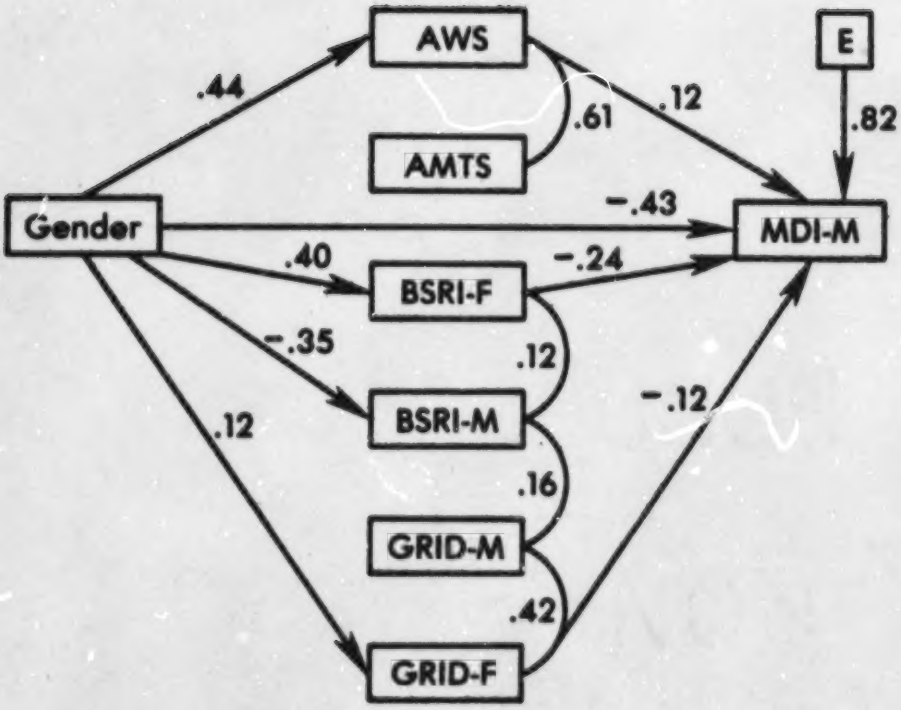

Figure 9

Trimmed path model with path coefficients for male dominance index for choice of college major. Curved lines indicate no assumption of direction of effect.

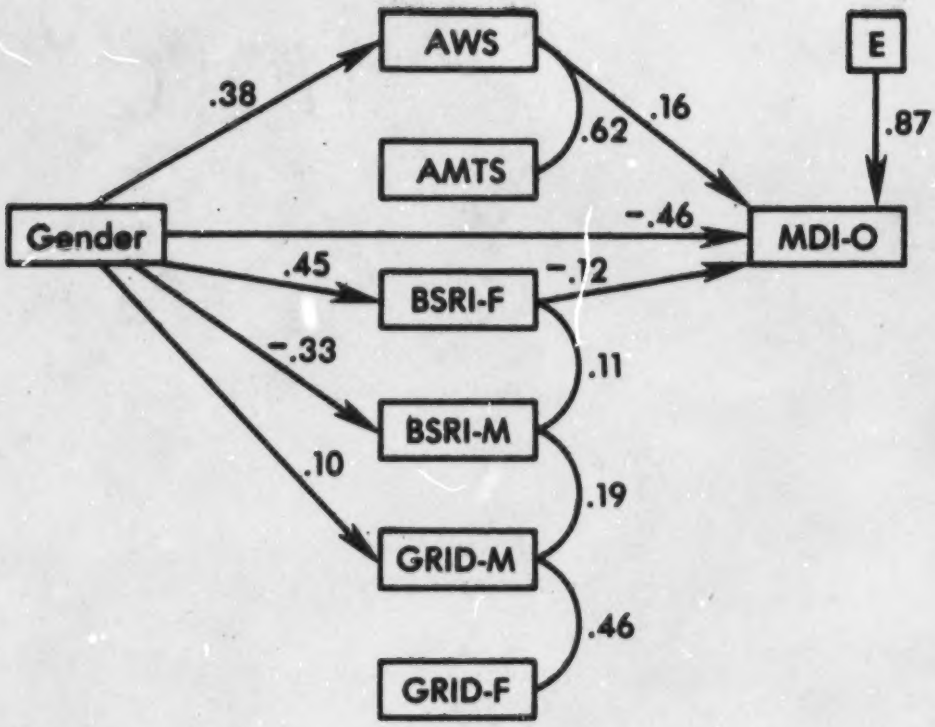

Figure 10

Trimmed path model with path coefficients for male dominance index for occupational choice. Curved lines indicate no assumption of direction of effect.

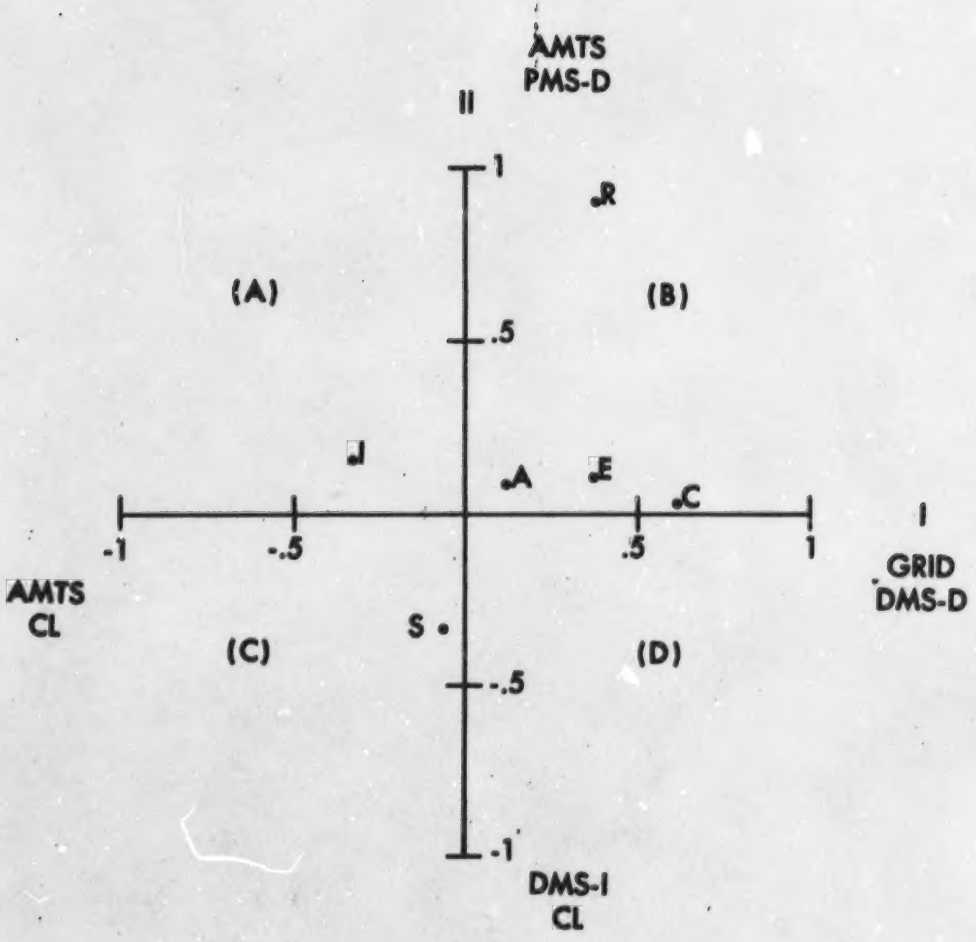

FIGURE 11

Group Centroids for Females on Major

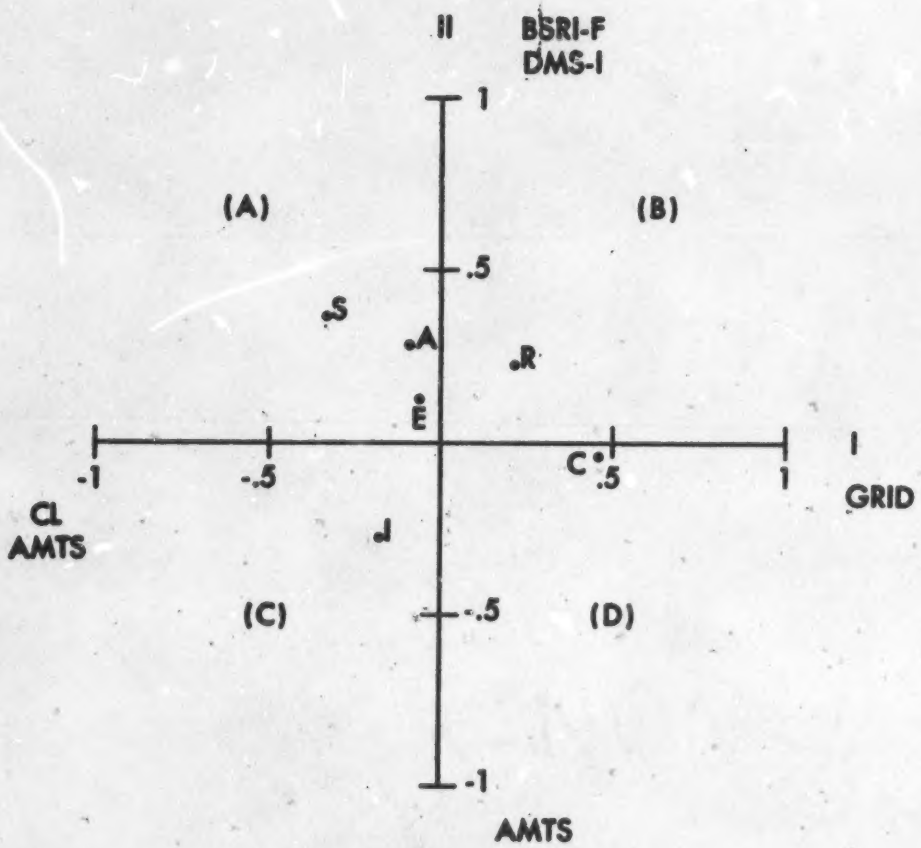

FIGURE 12

Group Centroids for Males on Major

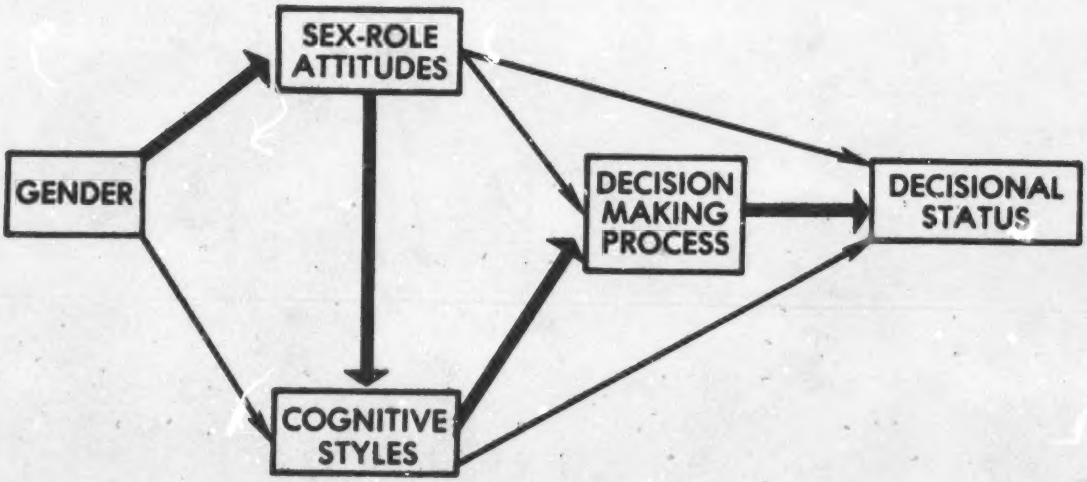

Figure 13

Path diagram depicting the causal relationships between gender, sex role attitudes, cognitive styles, decision-making process and decisional status regarding a college major.

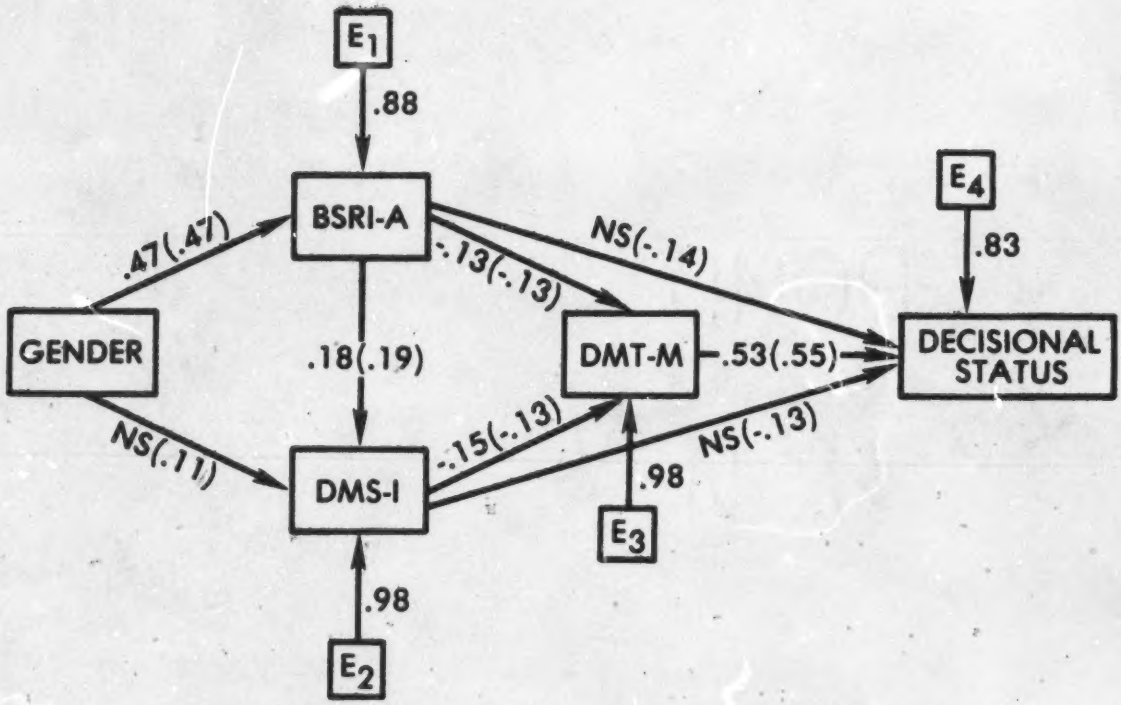

Figure 14

A specific full hypothesized path model with the path coefficients and zero-order correlations (in parentheses) included. The sex role attitude construct is measured by the BSRI-A and the cognitive styles construct is measured by the DMS-I.

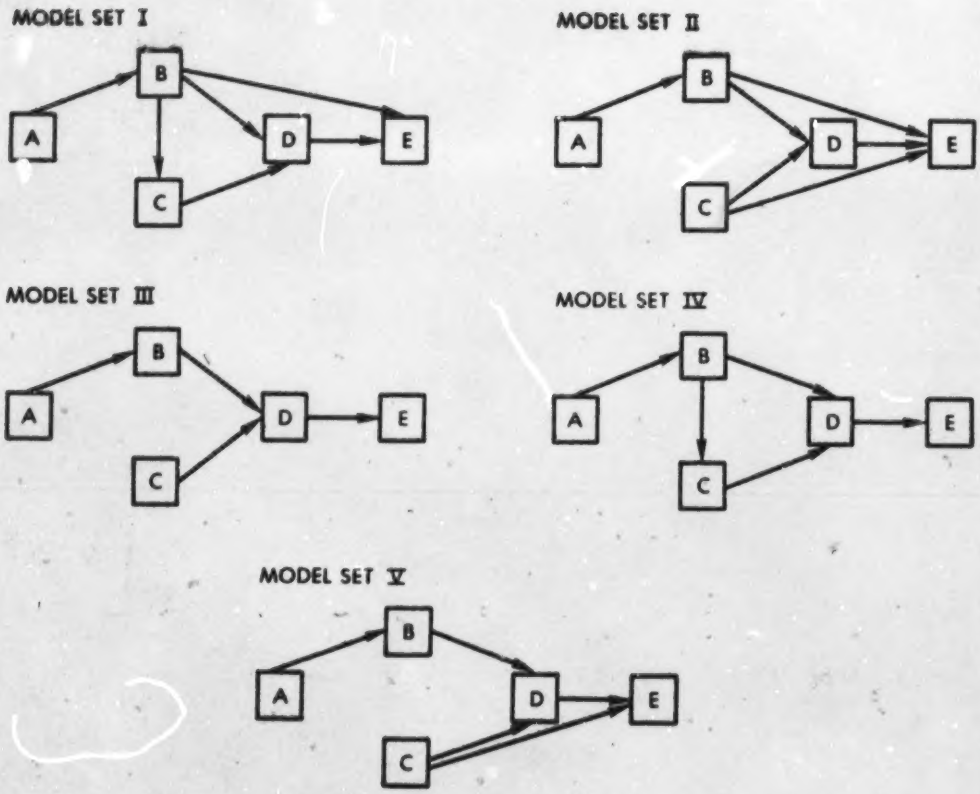

Figure 15

Trimmed path models corresponding to the five model sets: A = gender, B = sex role attitudes, C = cognitive style, D = decision-making process, and E = decisional status.

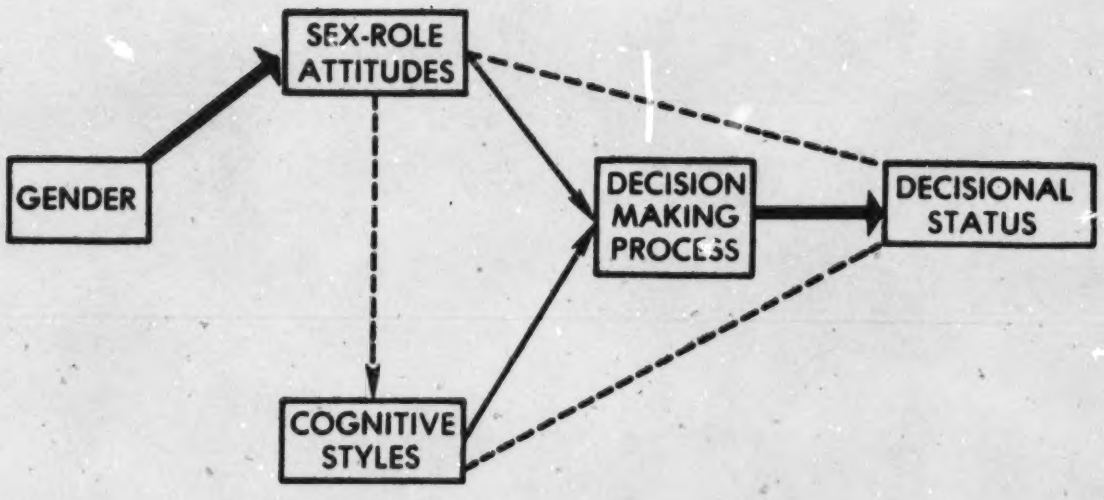

Figure 16

A path diagram model depicting the degree to which the empirical results support the original hypothesis.

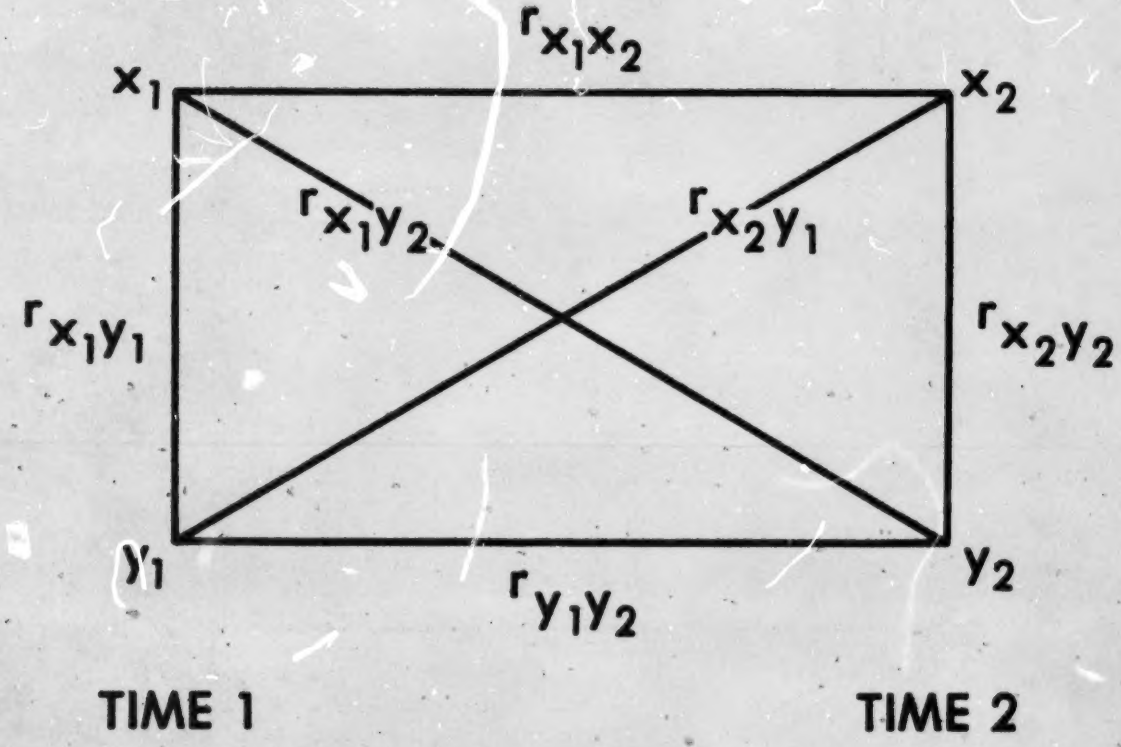

Figure 17

A Cross-Lagged Panel Diagram

VI. CONCLUSIONS

Discussion of Results

The purpose of this research was to study the career behavior of college students. We were interested in how the career decision-making process and outcomes varied according to gender, class level, and how career decision-making varied across time. In addition, we were interested in how career decision-making varied as a function of sex role attitudes and cognitive styles. In Figures 2 and 3, we presented an hypothesized ordering of influence among the variables which was based on the review of the literature and our own theoretical conceptualizations. We then posed a number of research questions and tested our expectations of what we would find for each question. While a number of our expectations were confirmed, several were not. As we discuss these results, then, we will relate them to our initial expectations and consider their theoretical implications.

Gender

We found a number of gender differences which required statistically controlling for gender or separate analysis for men and women. As expected, the primary influence of gender was on students' sex role attitudes with women being more liberal and androgynous than men. The importance of gender and sex role attitudes were most notable in choice of gender-dominant fields and in choice of field classified according to the Holland typology. Thus, gender and sex role attitudes continue to restrict students' career options. The gender differences found for the cognitive style variables were unexpected.

Cognitive Styles

Throughout the study, a number of cognitive style findings were unexpected. The low intercorrelations among the cognitive style variables suggest that cognitive style is a multi-dimensional construct. The three measures of cognitive style in this research are based on three independent theories, so that our results for each variable need to be interpreted in accordance with its respective theory.

Decision-Making Style

The three decision-making style variables are relatively uncorrelated, although there is a moderate negative correlation between the rational and intuitive styles. Theoretically, the rational style was expected to be positively related to progress in decision-making, while the intuitive style was expected to be uncorrelated and the dependent style to be negatively correlated. The findings reported in the path analysis for Question 10 show positive path coefficients for the rational style and negative coefficients for both the intuitive and dependent styles. Thus, being systematic, planful, and logical is related to progress in decision-making. The CLPA analysis partially confirms these findings in that progress in decision-making and having made a satisfying choice of major causes decreases in the use of the intuitive style. The intuitive style was also an important predictor of Holland categories. Both men and women in Social fields were more intuitive than students in Investigative fields.

We expected that sex role attitudes would be related to decision-making styles on the assumption that similar socialization processes are involved in the acquisition of both sets of variables. Nevertheless, there was insufficient theoretical or empirical bases for predicting specific relationships. We did predict, however (see Figures 2 and 3) that sex role variables would influence cognitive style; whereas the CLPA analysis suggests that the direction of causality was just the opposite. In the path analysis for Question 10 (see Table 23) we found a positive path coefficient between masculinity and the

rational style and negative coefficients between masculinity and the intuitive style. We also found that conservative attitudes towards men's roles were associated with the rational style. These findings are consistent with the CLPA analysis findings that increases in the intuitive style cause increases in femininity and increases in the rational style cause students to become more conservative regarding women's roles. To summarize, it appears that the rational style is associated with masculinity and conservative sex role attitudes; whereas, the intuitive style is associated with femininity and liberal sex role attitudes.

The findings regarding gender, class level differences and developmental changes in decision-making style were entirely unexpected. Prior to this research a number of studies, with small sample sizes, indicated no gender differences for the decision-making styles. Moreover, from developmental theory it was assumed that students would become more rational as they progressed through college and less dependent. Our results contradict these assumptions, as well as the folklore regarding "women's intuition." Regardless of class level, we found that women were more rational in decision-making style than men. Moreover, regardless of gender, freshmen were more rational, less dependent and less intuitive than upperclassmen. While the developmental analyses were less convincing, the trends in the data were consistent with the class level differences. A significant decrease in the use of the rational style occurred during the freshman year, while the decreases thereafter were not statistically significant. For the sexes combined there is an overall increase in the intuitive and dependent styles. The increase in the intuitive style, however, is primarily due to changes in women, since men do not significantly increase. With regard to the dependent style, sophomores and juniors increase over freshmen; whereas seniors decrease and are similar to freshmen.

At least two interpretations are suggested by these findings. The first is that these differences are due to social desirability response bias. Examination of the items comprising the three decision-making style scales suggests that the rational items may be more socially desirable than the intuitive and dependent items. This interpretation requires that freshmen

and women are more vulnerable to social desirability response bias than upperclassmen and men. While we are unaware of any evidence in support of these assumptions, further research is needed before this interpretation of the findings can be rejected. The second interpretation is to accept the results at their face value. That is, in fact, women are more rational than men and that freshmen are more rational, less intuitive and less dependent than upperclassmen. It is interesting to note the convergence of styles as class level increases. Perhaps these styles represent different strategies within one's repertoire that may be functionally adaptive, depending on the decision-making task at hand and the particular circumstances surrounding that task.

Conceptual Level

Regardless of class level, women are higher in conceptual level than men. Regardless of gender, conceptual level increases as class level increases. Finally, students in Social and Investigative majors are higher in conceptual level than students in Realistic and Conventional majors. While women were not expected to be higher than men in conceptual level, the other findings are consistent with conceptual level theory. It may be that college women are, in fact, higher in conceptual level than men; however, Hunt (1971) did not find gender differences among elementary and secondary school students.

Cognitive Complexity

Some of the findings for cognitive complexity were expected. Women in Conventional majors are less complex than women in Investigative majors. Similarly, men in Realistic and Conventional majors are less complex than men in Investigative and Social majors. Moreover, in the prediction of gender-dominant career choices, as expected, students who were more cognitively complex in judging female dominant occupations tended to choose male dominant majors. This finding is consistent with Bodden and Klein's (1973) finding that students use more constructs in judging disliked occupations than liked occupations. They also

concluded that people use more constructs to reject alternatives than to accept alternatives.

The unexpected findings regarding cognitive complexity, however, were that regardless of class level, women are less complex than men, and that women become less complex over time, while men do not. These findings are not readily interpretable. It is difficult to accept the findings at face value since they are inconsistent with the findings regarding conceptual level, where women were more abstract than men and where conceptual level increased as class level increased. We can consider the measuring instrument and the degree of relevance or salience of the task. The GRID required the student to rate 12 occupations on 12 occupationally relevant constructs (e.g., amount of education required, salary, security, etc). One's cognitive complexity score is a function of the degree of variation in the 6-point ratings across the 12 constructs. It could be argued that because of the overall lower career orientation of women compared to men, the rating task was less salient for women, so that their ratings across constructs were less varied.

The above interpretation, however, does not account for the decreases over time found for the total sample and for women. Perhaps cognitive complexity is necessary when deliberating about alternatives but not necessary once commitment has been reached. Since students increase in CDM and decisional status from Time 1 to Time 2, differentiation or complexity may be less relevant at Time 2. In any event, further research on cognitive complexity is clearly needed before these findings can be understood.

Sex Role Attitudes

In Question 6, we tested the assumption that one's sex role self-concept would be predictive of one's attitudes toward the role appropriate behavior of men and women. While we expected differences due to gender, we believed that one's sex role self-concept would be more predictive than one's gender of attitudes toward the role appropriate behavior of men and women. Contrary to our expectations, we found that sex role self-concept is not predictive of attitudes toward the role appropriate behavior of

men or women. We also found that gender predicted attitudes towards women's roles, but not attitudes towards men's roles. Thus, despite sex role consciousness activities on college campuses, and despite the feminist movement, gender continues to be the predominant influencer of sex role attitudes, particularly with regard to the role appropriate behavior of women. Moreover, the causal relationship between sex role self-concept and attitudes towards others was in the opposite direction than that expected. In the CLPA analysis for Question 10, it was found that an increase in liberal attitudes towards women's roles caused an increase in the self-ascription of femininity. Moreover, increases in liberal attitudes towards women's roles cause increases in liberal attitudes towards men's roles. Thus, beliefs about the role-appropriate behavior of others precedes and determines one's sex role self-concept. Moreover, one's attitudes towards women's roles determines one's attitude towards men's roles. Thus, as one becomes more liberal regarding the role appropriate behavior of women, one also becomes more liberal regarding men's roles, so that sex role constrictions for both sexes are lessened, resulting in less sex role stereotypic attitudes.

Gender-Dominant Career Choices

Just as gender significantly predicted attitudes towards women's roles, it also predicted choice of gender-dominant majors and occupations. However, the feminine related sex role attitudes and degree of cognitive complexity regarding female-dominant occupations, also predicted gender dominant choices. We had expected gender to be less predictive of gender-dominant choices than the sex role attitudes and cognitive styles. Thus, the influence of gender in restricting career options has not been moderated very much by these variables, at least not for the present generation of college students. It is also important to note that the male-related sex role attitudes and degree of cognitive complexity regarding male-dominant occupations were not predictive of gender dominant choices. Perhaps attitudes towards men's roles and the self-ascription of masculinity is not predictive of gender dominant career choices

because there is a much wider range of male-dominant than female-dominant occupations, especially among the fields requiring college degrees. Thus, masculine-related sex role attitudes may not constrict person's career options, and students' choices may reflect other variables, such as interests, skills, or personality characteristics.

Career Choice According to Holland Typologies

Holland code classification of students' choice of major was predicted by certain sex role attitudes and cognitive style variables. The occupational choices for women were also predicted, but not the occupational choices for men. We shall compare our findings with Holland's (1974) description of the personality types of each of the six occupational environments.

Our findings were least predictive of the Artistic and Enterprising groups. Men in Artistic majors, however, tend to be higher in femininity and more intuitive in decision-making style than the other groups (except Social men). Whereas, women choosing Artistic occupations are more liberal towards women's roles, masculine, and are lower in conceptual level than Social women. Holland's description of the Artistic type fits our findings for men as intuitive and feminine, but not our findings for women.

Our findings clearly differentiated Investigative from Social majors for both men and women. In common, men and women Investigative majors are high in conceptual level and cognitive complexity and are low in the intuitive decision-making style. Regarding sex roles, both men and women Investigative majors are liberal towards men's roles; and while Investigative men are less feminine than other groups of men, Investigative women were not predicted by their femininity score. Thus, women in Investigative majors are neither more nor less feminine than women in other majors. Comparing these findings with Holland's description of Investigative types, the most descriptive adjectives are analytical, critical, intellectual, methodical, and rational. The first three adjectives correspond to persons who are abstract in conceptual level and are cognitively

complex. While they are not clearly more rational, both men and women in Investigative majors are less intuitive in decision-making style.

Men and women in Social majors and women choosing Social occupations are conservative towards men's and women's roles, high in conceptual level and cognitive complexity, and high in femininity. One difference between men and women in the Social group is that women in Social majors and occupations are advanced in the decision-making process regarding major and occupation; in contrast men in Social majors show low progress in decision-making regarding major. We would interpret this difference as follows. The Social group is more female-dominant; so that being female and having conservative attitudes towards women and men's sex roles is consistent with being a Social major and choosing a Social occupation. For men in Social majors, however, while their choice is consistent with their self-ascribed femininity, it is inconsistent with their conservative attitudes towards men's and women's roles. This inconsistency may generate some conflict or uncertainty for men in Social majors that may be reflected in their lower progress in the decision-making process.

These findings support Holland's description of Social types as feminine. The conservative sex role attitudes may be only indirectly related to the qualities of being cooperative, sociable and responsible. The higher conceptual level and cognitive complexity may related to being insightful. More important evidence in support of Holland's typology is his description of Social types as having an aversion to the activities of the Realistic type. This is clearly true for women for both major and occupation, but not for men.

Both men and women in Conventional majors have conservative attitudes toward the sex role behavior of men, are more concrete in conceptual level, and are less cognitively complex than Investigative and Social majors. Women, but not men in Conventional majors are also high in the dependent decision-making style. These findings are consistent with Holland's description of Conventional persons as having an aversion to ambiguous, free, exploratory, or unsystematized activities; to be inflexible, practical, and unimaginative. For women, with a high dependent decision-making style, the characteristics of being

conforming or obedient also apply.

Similarly to Conventional majors, men and women are more concrete in conceptual level and less cognitively complex. However, men and women in Realistic majors differ in that men are conservative regarding men's roles while women are liberal regarding men's roles. Women choosing Realistic occupations are also liberal regarding women's roles and high in the dependent decision-making style. Both men and women are high on masculinity. The cognitive characteristics are consistent with Holland's description of Realistic types as being deficient in educational competencies; valuing concrete things; and being materialistic and uninsightful. Also consistent is Holland's description of Realistic types as being masculine.

In conclusion, many of our findings substantiate Holland's typology. It appears, however, that the personality characteristics associated with each occupational type do not always apply to both men and women. We would suggest, then, that the Holland typologies should be elaborated to include not only different descriptions according to gender, but also, personality descriptions within each sex that consider differences in sex role attitudes ascribed to self and to same-sex and opposite-sex others.

Decisional Status

The hypothesized order among the variables expected to influence decisional status was based primarily on our theoretical assumption that self-concept (or self-ascription) influences attitudes toward others (other-ascription), and that these variables are modified by one's cognitive-perceptual processes; so that they affect both one's progress in the process of career decision-making, and the outcome of the CDM process, i.e., having made a satisfying choice of major and occupation. This theoretical position was also substantiated by the review of the literature. Our path analysis partially supported this ordering of influence among the variables, and hence, our assumptions about the direction of the causal relationships.

The results of the CLPA analysis, however, not only call into question the path analysis results,

but also challenge the underlying assumptions from career development and self-concept theory. Super, Starishevsky, Matlin, and Jordaan (1963) postulate that persons' career development depends on the degree to which their self-concept is formed and crystallized. Persons' vocational self-concepts are implemented through their occupational decisions. Thus, the resolution of developmental tasks presupposes a crystallized self-concept, such that the latter "causes" progress in the former. In contrast, Tiedeman and O'Hara (1963) assume that persons progress through the stages of development in a cyclic fashion in which there are reciprocal, bi-directional person-environment interactions. This approach (Peatling and Tiedeman, 1977) assumes that as one defines self through one's self-reflective thoughts and feelings, one engages in activities which implement the self-concept and the consequences of these activities serves to further differentiate or redefine the self. The direction of effects found in our analysis reflect the differentiation of the self following career implementation and are thus more consistent with the model proposed by Tiedeman and his associates than that proposed by Super and his associates.

The findings related to the direction of causality between sex role attitudes and cognitive styles were not consistent with the results of the path analysis, in which it was assumed that sex role attitudes influenced cognitive styles. Two of the three significant comparisons involving sex role and cognitive measures suggests a direction of causal influence which is opposite to that posited in this study. Thus, our future conceptual models which attempt to account for the growth on sex role and cognitive measures must recognize that these sets of constructs exert a complex source of influences on each other. Our theories must reflect this interactional, bidirectional involvement.

Regarding sex roles, it was found that increases in liberal attitudes towards women's roles cause an increase in the self-ascription of feminine qualities. Moreover, liberal attitudes toward women's roles cause increases in liberal attitudes towards men's roles.

The above CLPA results not only have important theoretical implications but also have practical implications for sex role consciousness raising

activities. Most models of consciousness raising focus participants' attention on the sex role related aspects of their self-concept (Brodsky, 1973; Farrell, 1975; Pobrebin, 1973; and Moreland, 1976). The assumption is that if individuals expand their view of themselves to include qualities typically ascribed to the opposite sex, that this will be followed by changes in persons' attitudes toward role appropriate behavior for men and women. On the contrary, our results suggest that changes in the sex role related aspects of students' self-concepts may be facilitated by changes in their sex role attitudes towards others. Thus consciousness raising procedures should first focus on women's roles. Changes in attitudes towards women's roles will then facilitate changes in attitudes towards men's roles. Finally, these changes will then cause changes in one's sex role self-concept.

These results also have important practical implications for career counseling and career education. The impact of career implementation on further differentiation of the self-concept suggests that counselors and career educators adopt the bidirectional, person-environment interaction model. One might well start with an assessment of the person's present level of self-concept crystallization, and then suggest or provide career-relevant behaviors or activities (person-environment interactions) that will further differentiate the self-concept. In turn, following the newly differentiated and integrated self-concept, additional career-related activities can be engaged in, and so on, as the person continues the process of commitment and implementation.

This concludes the discussion of the results reported in the previous chapter. As was indicated in the introduction of this report, students were selected for interviewing to provide us with qualitative data which would hopefully aid us in the interpretation of the quantified results. In addition, we hoped to identify factors associated with CDM progress and to use this information to design a career decision-making program to facilitate CDM progress. In the next section, we will briefly discuss our conclusions from the interview data. How the data was used to develop a new model of career decision-making and to design the CDM program is con-

tained in the companion to this report entitled, "Career Decision-Making for College Students: Facilitator's Handbook."

Summary of Interview Results

For our interviews, three different interview schedules were designed. These are contained in Appendix B. Following Time 1 testing, extreme high and low scorers on the ACDM within each class were selected for interviewing. Interview Schedule I was designed to gather family background data and school experiences that might be related to the students' current level of CDM. We also explored students' degree of commitment to a major and an occupation, and assessed their general life goals. Following Time 2 for the graduating senior sample, we selected extreme positive and negative changers on the ACDM for interviewing. Interview Schedule II focused on immediate post-graduate career plans, long term career plans, and personal expectations regarding one's future. Following Time 2 for the remaining samples we used the same procedure to select subjects as for the senior sample. Interview Schedule III was designed to assess the student's degree of commitment to a major, and the factors that they feel have influenced changes in their level of commitment since Time 1.

The results from Interview Schedule III were of most use to us in interpreting our quantitative results and in designing the CDM program. Schedules I and II provide useful case study material for the CDM program, but there were no clear patterns across interviewees that could be identified.

Appendix B contains a list of the major change influences that were identified. Contrary to our expectations, parents and peers had little influence on the CDM of positive changers. The most significant influence was that of instructors and/or courses. Both negative and positive changers had experienced negative reactions to some instructors and courses in those courses related to their former major. Positive changers, however, almost universally reported a positive reaction to one or two instructors and courses in alternative majors, which facilitated their commitment to a major, and negative changers

reported no similar positive reactions.

For most interviewees, the content or subject matter of the course was less a determining factor than the qualities of the instructor. Instructors who provided specific feedback on one's performance (i.e., written comments on essay exams and term papers as opposed to scores or grades on objective exams) and those who showed a specific interest in the student seemed to have the most impact. In several cases, this influence was not from an instructor of a course the student was enrolled in but from a faculty member having a reputation of being interested in students or from the student's faculty advisor. In the case of six positive changers, they had sought career counseling and attributed their change not only to the help they had received but also to the relationship they had developed with the counselor.

We believe that this consistent finding among positive changers fits into recent theory on the importance of having a mentor, one with whom one can identify, have a close relationship with, and model one's behavior after. Students who have not developed a mentor-relationship seem to feel less attraction toward the field represented by the instructor and report boredom, disinterest, and lack of involvement. While the availability of appropriate potential mentors is an issue, negative changers seemed to exhibit more passivity, or lack of assertiveness, in making approach responses to instructors, thus reducing the likelihood that a mentor-mentee relationship could develop.

Surprisingly, peers seemed to have little influence on the positive or negative changers. What influence there was in isolated cases had a debilitating rather than facilitating effect. For instance, in one case, a roommate continually disparaged the student's major; in another, a woman decided to marry and go to work rather than complete her degree. Similarly, parents were seen as either a neutral or negative influence. In only one case was parental influence seen as a positive factor.

A number of other changes were frequently noted among the positive changers on the ACDM: Increased levels of self-esteem, greater clarity of identity, increasing assertiveness, and an increasing sense of responsibility for one's behavior. (These changes corroborate our findings from the CLPA

analyses.) Little evidence was found, however, of a greater sense of purpose or long-term, life-style planning. Perhaps such changes could be observed over a longer time span than the one-year interval involved here.

Finally, a further important influence was students' experiences in work-related field settings. In a few cases these work experiences resulted in greater career commitment, but more often it resulted in being less optomistic about one's future, re-assessment of one's commitment, and consideration of other alternatives.

These interview findings, then were useful in the development of a new theory of career decision-making and in designing the CDM program, both of which are provided in the companion report.

Summary

As is so often the case, this research raises more questions than it answers. The expected results provide empirical support for existing theory as well as greater clarification of the results of earlier studies. The unexpected results, however, provide new directions for further research and suggest significant revisions of existing theories. Finally, it is believed that the results have practical applications for the modification of interventions to facilitate the career decision-making process.

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Appendix A

Source Tables

Table A-1. Means and Standard Deviations for Returners and Non-Returners.
Tables A-2 to A-10. ANOVA Source Tables for Significant Gender Differences.
Tables A-11 to A-19. ANOVA Source Tables for Significant Class Level Differences.
Tables A-20 and A-21. Means for Predictor Variables and Frequences of Subjects Classified by Holland Codes.

Table A-1

Comparison of Means and Standard Deviations for Those Who Returned and Those Who Did Not Return for the NIE Longitudinal Study

		Freshmen				Freshmen				Sophomores				Juniors				Seniors			
		Males		Females		Males		Females		Males		Females		Males		Females		Males		Females	
		R[a]	NR	R	NR	R	NR	R	NR	R	NR	R	NR	R	NR	R	NR	R	NR	R	NR
		44	15	55	16	57	31	59	24	39	28	51	27	46	24	44	22	27	39	25	32
DMT-M	$\bar{X}$	25.0	25.2	26.2	25.6	25.2	25.5	25.2	25.7	26.4	26.3	25.9	26.3	26.3	26.9	26.5	27.0	26.6	26.3	25.8	26.4
	SD	3.8	4.0	3.2	4.8	3.7	3.8	4.2	3.5	3.4	3.4	3.1	3.3	2.8	2.6	1.9	1.7	2.2	2.3	2.6	2.5
AMTS	$\bar{X}$	173.3	172.5	190.5	197.9	149.2	150.9	160.3	163.2	152.7	153.1	160.0	159.5	152.8	149.3	162.4	163.5	163.9	157.3	164.4	162.3
	SD	23.7	18.2	20.7	25.7	13.6	15.5	14.0	11.1	13.2	12.7	12.0	13.7	13.4	11.2	11.9	14.8	10.1	13.4	14.5	10.4
AWS	$\bar{X}$	70.1	70.1	79.3	82.6	69.4	71.5	82.3	84.7	72.8	71.4	81.6	81.3	72.8	69.1	84.3	85.4	79.6	76.6	84.1	85.0
	SD	10.2	10.6	9.7	11.4	12.2	11.6	10.2	5.5	10.2	12.9	9.8	10.1	12.0	10.4	9.5	8.7	11.2	11.3	10.2	9.0
BSRI-M	$\bar{X}$	5.3	5.2	4.9	4.6	5.2	5.2	4.8	4.8	5.1	4.9	4.8	4.8	5.2	5.0	4.9	5.1	5.2	5.3	4.7	4.7
	SD	.7	.6	.7	.8	.6	.6	.7	.6	.7	.7	.7	.6	.6	.6	.7	.7	.5	.7	.6	.7
BSRI-F	$\bar{X}$	4.6	4.6	5.2	5.0	4.6	4.6	5.1	5.0	4.6	4.5	5.1	5.1	4.7	* 4.5	5.0	4.9	4.6	4.6	5.1	5.1
	SD	.6	.5	.6	.6	.5	.4	.5	.6	.5	.6	.6	.5	.5	.4	.5	.5	.5	.5	.6	.5
BSRI-X	$\bar{X}$	2.5	2.4	2.6	2.4	2.4	2.5	2.6	2.5	2.4	2.1	2.6	2.7	2.6	2.3	2.7	2.2	3.0	2.8	2.4	2.6
	SD	1.3	1.1	1.2	1.2	1.2	1.2	1.1	1.0	1.2	1.3	1.0	1.1	1.1	1.2	1.2	1.1	1.2	1.0	1.1	1.2
DS	$\bar{X}$	2.3	2.3	2.5	2.6	2.4	* 2.6	2.5	2.5	2.6	2.5	2.5	2.6	2.6	2.4	2.7	2.7	2.6	2.6	2.4	2.6
	SD	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5
DMS-R	$\bar{X}$	4.5	4.5	4.9	4.4	4.7	4.2	4.9	4.5	4.0	4.0	4.2	4.4	4.1	3.6	3.6	4.1	3.7	3.6	3.5	3.7
	SD	1.3	1.7	1.7	1.9	1.6	1.6	1.5	1.4	1.5	1.5	1.8	1.6	1.7	1.6	1.7	1.6	1.6	1.6	2.0	1.8
DMS-I	$\bar{X}$	3.2	2.7	3.2	3.1	3.1	2.6	3.4	2.9	3.2	3.5	3.5	3.5	2.8	2.9	3.1	3.3	3.3	3.2	3.6	3.3
	SD	1.7	1.5	1.3	1.0	1.1	1.1	1.2	1.2	1.4	1.6	1.4	1.2	1.3	.9	1.2	1.1	1.8	1.4	1.7	1.2
DMS-D	$\bar{X}$	1.7	1.7	1.7	1.3	1.9	2.0	1.7	1.6	1.9	2.5	2.1	2.0	2.1	1.7	1.8	2.3	1.7	2.0	2.3	2.1
	SD	1.4	1.3	1.2	1.1	1.5	1.3	1.4	1.4	1.6	1.8	1.8	1.4	1.5	1.5	1.6	1.6	1.6	1.6	1.6	1.3
CDG	$\bar{X}$	236.5	206.6	240.0	244.3	227.9	235.4	233.9	229.2	247.4	224.1	237.9	244.1	239.8	241.9	251.4	265.3	223.8	237.1	240.6	234.3
	SD	44.7	37.7	51.1	46.1	45.4	50.0	45.4	47.1	54.0	46.0	56.2	49.7	51.7	52.7	51.1	56.1	57.5	49.1	46.1	40.0
% of returns from total		75		77		65		71		58		65		66		67		41		44	

[a]Note: R = return, NR = did not return

*Denotes statistical differences between means ($p \leq .05$)

Tables A-2 to A-10

ANOVA Source Tables for Significant Gender Differences

Table A-2

Decision Making Style - Rational

Source	d.f.	SS	MS	F
Class	3	143.62	47.87	18.73**
Sex	1	14.61	14.61	5.72*
Class x Sex	3	10.84	3.61	1.41
Error	883	2256.58	2.56	

*p<.05 **p<.01

Table A-3

Decision Making Task - College

Source	d.f.	SS	MS	F
Class	3	94.66	31.55	6.92**
Sex	1	46.98	46.98	10.30
Class x Sex	3	10.84	3.61	.79
Error	883	4027.30	4.56	

Table A-4

Cognitive Complexity

Source	d.f.	SS	MS	F
Class	3	15789.60	5263.20	1.64
Sex	1	27769.85	27769.85	8.66**
Class x Sex	3	774.51	258.17	.08
Error	1089	3494070.00	3208.51	

Table A-5

Attitude Toward Women Scale

Source	d.f.	SS	MS	F
Class	3	7176.91	2392.31	19.96
Sex	1	26236.33	26236.33	218.87**
Class x Sex	3	666.99	222.33	1.86**
Error	1089	130540.94	119.87	

Table A-6

Attitude Toward Masculine-Transcendence Scale

Source	d.f.	SS	MS	F
Class	3	10220.91	3406.97	5.73**
Sex	1	60266.16	60266.16	101.29**
Class x Sex	3	1226.97	408.99	.69
Error	1089	647961.19	595.01	

Table A-7

BSRI - Masculinity

Source	d.f.	SS	MS	F
Class	3	1.135	.38	.83
Sex	1	24.41	24.41	53.25**
Class x Sex	3	1.59	.53	1.16
Error	1089	499.14	.46	

Table A-8

BSRI - Femininity

Source	d.f.	SS	MS	F
Class	3	2.96	.99	3.53*
Sex	1	60.65	60.63	216.66**
Class x Sex	3	1.71	.57	2.04
Error	1070	299.45	.28	

Table A-9

BSRI - Androgeny

Source	d.f.	SS	MS	F
Class	3	39.54	13.18	3.84**
Sex	1	946.97	946.97	275.79**
Class x Sex	3	16.03	5.34	1.56
Error	1070	3674.07	3.43	

Table A-10

Conceptual Level

Source	d.f.	SS	MS	F
Class	3	32.60	10.87	30.57**
Sex	1	9.02	9.02	25.38**
Class x Sex	3	8.21	2.74	7.69**
Error	1070	380.39		

Tables A-11 to A-19

ANOVA Source Tables for Significant Class Level Differences

Table A-11

Decision Making Style - Rational

Source	d.f.	SS	MS	F
Sex	1	16.53	16.53	6.47*
Class	3	141.70	47.23	18.48**
Sex x Class	3	10.84	3.61	1.41
Error	883	2256.58		

Table A-12

Decision Making Style - Intuitive

Source	d.f.	SS	MS	F
Sex	1	3.91	3.91	2.52
Class	3	20.29	6.76	4.35**
Sex x Class	3	12.34	4.11	2.65*
Error	883	1371.97	1.55	

Table A-13

Decision Making Style - Dependent

Source	d.f.	SS	MS	F
Sex	1	6.03	6.03	3.37
Class	3	30.01	10.00	5.60**
Sex x Class	3	16.16	5.39	3.02*
Error	883	1576.78	1.79	

Table A-14

Decision Making Task - College

Source	d.f.	SS	MS	F
Sex	1	43.40	43.40	9.52**
Class	3	98.25	32.75	7.18**
Sex x Class	3	10.84	3.61	.79
Error	883	427.30	4.56	

Table A-15

Decision Making Task - Major

Source	d.f.	SS	MS	F
Sex	1	.06	.06	.01
Class	3	120.52	40.17	4.45**
Sex x Class	3	24.25	8.08	.90
Error	883	7967.11	9.02	

Table A-16

Decision Making Task - Occupation

Source	d.f.	SS	MS	F
Sex	1	17.15	17.15	1.62
Class	3	437.86	145.96	13.82**
Sex x Class	3	8.87	2.96	.28
Error	883	11497.33	10.56	

Table A-17

Attitude Toward Women Scale

Source	d.f.	SS	MS	F
Sex	1	25462.63	25462.63	12.41**
Class	3	7950.61	2650.20	22.11**
Sex x Class	3	666.99	222.33	1.85
Error	1089	130540.94	119.87	

Table A-18

Attitude Toward Masculine Transcendence Scale

Source	d.f.	SS	MS	F
Sex	1	57835.85	57835.85	97.20**
Class	3	12651.21	4217.07	7.09**
Sex x Class	3	1226.97	408.99	.69
Error	1089	647961.19	595.01	

Table A-19

Conceptual Level

Source	d.f.	SS	MS	F
Sex	1	8.77	8.77	24.67**
Class	3	32.85	10.95	30.80**
Sex x Class	3	8.21	2.73	7.69**
Error	1070	380.39	.36	

Table A-20

Means for Predictor Variables by Holland Code Classification of Major for Females (N = 491)

Variable	R (9)*	I (170)	A (82)	S (133)	E (51)	C (46)
DMS-R	3.78	4.36	4.46	4.53	3.71	4.06
DMS-I	2.67	3.02	3.29	3.26	3.49	3.20
DMS-D	1.89	1.89	2.35	1.65	2.53	1.98
DMT-M	24.78	27.02	26.45	26.88	26.67	26.02
GRID	252.00	239.99	235.39	250.84	251.67	253.89
AWS	86.44	83.81	84.30	81.50	80.78	78.67
AMTS	190.44	187.19	176.84	174.11	177.14	171.20
BSRI-M	4.86	4.91	4.79	4.88	4.89	4.90
BSRI-F	5.30	5.07	5.09	5.16	5.07	4.95
CL	1.26	1.71	1.65	1.79	1.64	1.51

*Number in Parentheses = N

Table A-21

Means for Predictor Variables by Holland Code Classification of Major for Males (N = 433)

Variable	R (50)*	I (154)	A (79)	S (45)	E (22)	C (83)
DMS-R	4.50	4.21	4.18	4.00	3.77	3.77
DMS-I	3.08	2.82	3.14	3.13	3.36	2.82
DMS-D	2.04	1.76	2.20	2.24	1.73	1.93
DMT-M	26.94	26.96	26.25	26.36	26.77	26.73
GRID	227.40	230.23	228.48	235.49	233.73	250.42
AWS	70.04	74.84	74.32	74.69	76.64	70.11
AMTS	158.40	169.04	162.13	166.09	163.04	159.94
BSRI-M	5.21	5.13	5.16	5.37	5.21	5.14
BSRI-F	4.63	4.55	4.65	4.80	4.63	4.58
CL	1.32	1.55	1.57	1.73	1.58	1.33

*Number in Parentheses = N

APPENDIX B

Interview Results

List of Major Change Influences

Negative Changers

Negative experience in courses related to their major
Dislike of course instructor
Negative course experience in father's field
Negative field work or on-the-job experience related to major
Negative attitude of roommate to some field
Fallen in love, wants to drop out of school and get married
No alternative courses tried, or if tried, also disliked
Pressure from work and marriage
Low self-esteem
Lacking identity and clear values
Had not sought help from any source
Significant others cause person conflicts

Positive Changers

Negative course experience in prior major coupled with positive experience in new major
Initially undecided about major followed by positive course experience in major
Decided but uncertain about major, followed by positive, confirmatory experience in same major
Liked course instructor(s)
Sought help from faculty advisor
Sought help from professional career counselor
Greater awareness of interests, values, goals
Higher self-esteem

Interview Schedule I

As I explained to you on the phone, you were chosen for this interview because of the pattern of responses you gave to the set of tests you took for us. I don't know what that pattern is, which is why I'm able to interview you. As you know, we're investigating a variety of areas that may have influenced you in choosing a major or deciding on a career.

1. I'd like to begin by asking you to think about your immediate family. Could you tell me the names and ages of your brothers and sisters?

2. What was each sibling doing (if older) when you were living at home? Did he or she like that job? How did you feel about it?

3. And what is he or she doing now? How do you feel about his or her job? Do you think there's an ideal career for this person? Why?

4. Many children find they have special roles they played in their families (mother's helper, good student, black sheep, etc.). Can you remember what role you and each of your siblings played?

5. How would you summarize your relationship with your brothers and sisters? (Close, loyal, competitive, etc.)

6. How do you think your parents would describe each of you? What role or particular behavior do you think they would identify with each of you?

7. Would your parents have the same perception or do they see you differently?

8. How old is your father? What did he do when you were growing up? Did he like his job? Were you proud of his job? Did you think of doing the same type of work? Did your mother approve of his job? For what reasons?

9. Has your father changed jobs recently? What do you think he'd rather be doing? Can you think of an ideal job for him?

10. What kind of relationship did he have with his children?

11. How did he respond when his career demands conflicted with family demands?

12. How old is your mother? What did she do when you were growing up? Did she like her job? Were you proud of her job? Did you think of doing the same type of work? Did your father approve of her job? For what reasons?

13. Has your mother changed jobs recently? What do you think she'd rather be doing? Can you think of an ideal job for her?

14. What kind of relationship did she have with her children?

15. How did she respond when her career demands conflicted with family demands?

16. Who helped you with homework?

17. Who helped you with school projects?

18. Did either parent get involved with your extra-school activities? (Scouts, religious training, clubs)

19. Who went to school to talk with your teachers if there was a problem?

20. Anyone else living with you? (Cousins, grandparents, etc.) What did they do? What kind of role did they play in your family?

21. Is there anything else about your family that might tell us something about why you're doing what you're doing? (Illness, family tradition)

22. What are your three strongest qualities? Rank-order?

23. For each quality, ask interviewee to think back to a critical incident which helped shape this self-perception.

24. How has the interviewee's choice of a major been influenced by her/his perception of own positive qualities?

25. What are your three weakest qualities?

26. For each quality, ask interviewee to think back to a critical incident which helped shape this self-perception. (Make sure interviewee gives incidents that <u>shape</u> rather than merely <u>reflect</u> self-perception.)

27. How has the interviewee's choice of a major been influenced by her/his perception of own negative qualities?

28. What are your major goals in life?

29. How did these come to be important goals for you?

30. How is your choice of major related to these goals?

31. How is your choice of a career related to these goals?

32. What is your current major? (Most of us change our minds several times before finally settling on a major.)

33. What other majors are you seriously considering? Have any of these been declared at any time?

34. Going back to each potential (and/or declared) major and taking them one at a time ask: What types of experiences occurred to make you change your mind? (Describe both approach and avoidant reasons.)

35. What would you most like to do as a career?

36. What types of experiences have you had that influenced your choice?

37. (Most of us go through a series of decisions before finally arriving at a choice we follow through on.) What other career alternatives are you seriously considering in addition to your most desired career?

38. (Taking each career alternative one at a time) What is attractive to you about _____ as a career?

39. (Taking each alternative one at a time) What about _____ makes it less attractive than your #1 choice?

40. (Think back over your life and try to remember those people who have been most important to you. Perhaps you will remember parents, grandparents, or other relatives; teachers, neighbors, friends, etc.) Who are these people? In what way have they been most important to you?

41. (Taking each significant person separately) How did _____influence your choice of careers if at all?

42. Have you ever considered a career because someone you know, respect or admire is in that occupation/profession? If yes, list and describe each one.

43. (For each instance) What led you to decide against following _____'s example and entering _____ as a career?

44. What types of courses have you had which have influenced your career choices in either a positive or negative direction?

45. How have you decided what you want to do (provide enough structure to get at person's perception of their decision making <u>strategy</u> and relevant experiences)?

46. Have you participated in any personal growth groups which influence your career choices?

47. Was high school guidance in any way helpful?

48. Have you ever participated in career counseling? Career workshops? Etc.?

49. Have you had any jobs which influenced you?

50. Who are people who are currently important to you? How does each feel about your career plans? Why do they feel that way?

51. Draw a Life Line (Explore some of the life-line components -- undulations, plateaus, etc., and see what life-events are corresponding to them.)

Interview Schedule II

TOPIC ONE: Plans for the Immediate Future (after graduation)

1. You've probably given some thought to what you want to do right after you graduate. What are your career plans for the immediate future (Note: immediate here can be anything from just after graduation to six months or even a year after)?

   a. Do you have a job that you expect to begin following graduation or are you now in a job that you expect to continue in following graduation?

      1) If so, how did you get the job (i.e., sending in applications, resumes, did someone tell you about it, etc.)

      2) Is this job related to your long-term career goal(s)? (If yes, show how; what is the relation between job and goal; give an example of the relationship between what you do on the job and what your goals are)

      3) Is this job related to your current major or academic interest? (If yes, find same information as above)

   b. What other plans do you have for your immediate future? (travel, Peace Corps, grad school, etc.)

      1) Do these immediate plans reflect a proactive stance or are they a means of postponing starting a career?

      2) In the next 2-3 years, what kinds of things do you anticipate will be important activities for you? (Note: be aware of events significant by their absence -- marriage, work, etc.)

a) How do significant others feel about these plans?

b) When did you make these post-graduation plans? What were important considerations/parameters that helped you make this decision(s)?

TOPIC TWO: Long Term Career Plans

1. What type(s) of long term career goals are you aiming for? (Be as specific as possible here -- own business, corporate vice-president, senator, etc.)

2. Are these career aspirations related to your current academic major or minor? If not, how did you get from your major to your career choice?

3. a. In terms of your qualifications, what do you believe you can realistically achieve in your career?

   b. What do you perceive to be the limitations that may prevent you from attaining your career plans or goals (personal or environmental limitations)?

4. Family traditions, close friends, and other groups and organizations (political and social) to which we belong often play an important part in our long term life plans. How has the subculture to which you belong influenced your long term career plans or goals?

   a. Did other factors influence your choice? Perhaps a reaction against something you grew up with (drug addiction, alcoholism, racial or sexual stereotype)

   b. Do you sense (as a Black male or female) that you have more career options than older Black men and women had? If so, how has this directly affected you?

5. Our nation is currently experiencing a women's movement for equal rights which is changing the job market. How has this movement influenced your career choice(s)? Has the breakdown in stereotypes opened new options for you?

   a. What effect is the social pressure to hire females and minorities having on your expectations of getting a job in your chosen field?

TOPIC THREE: Personal Expectations Following Graduation

1. People often make major changes as they near graduation. Can you remember what your career plans were about 4 months ago as you first participated in this study? Have you noticed any changes in these past months?

   a. Did you encounter any difficulties or new options as a result of school experiences (grad school acceptance or rejection, new course suddenly experienced last semester, etc.)?

   b. Did you learn of, or were you offered, a job in a field you had not earlier considered? Or did you become discouraged about the prospects of finding a job in your area?

   c. Did you experience some personal changes (marriage, dependents, inheritance, etc.) that would pressure/free you to change your vocational plans?

2. What kinds of personal changes do you anticipate during your first year out of college? (financial independence, responsibility, family, travel, relocating, etc.)

3. What is your most optimistic hope

   a. For the immediate future?

   b. For the long term future?

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4. What is your most catastrophic expectation

   a. For the immediate future?

   b. For the long term future?

5. What are your immediate concerns as you leave college?

6. If you could be anything you wanted to be (ignoring education, talents, political constraints, etc.), what would you do (career or avocationally) post-graduation?

7. How do you explain the discrepancy (if any) between your ideal plans and your real plans (vocational and avocation)?

8. How do your family and significant others feel about your short-term plans? Do they approve? Why or why not?

   a. Mother

   b. Father

   c. Fiancee/spouse/lover

   d. Others

9. How do your family and significant others feel about your long term plans? Do they approve of these plans? Why or why not?

   a. Mother

   b. Father

   c. Fiancee/spouse/lover

   d. Others

10. Do you anticipate modifying either your plans or your relationships because of disapproval or pressures?

11. Try to imagine what you will be doing in 10 or 15 years. Take some time to try to fantasize the things that will be important to you or part of your life.

    a. Do you imagine you will be doing the same kind of work then as you are now planning on doing? Will you make vertical or horizontal (promotions or career) changes? Do you foresee the need for further and/or different education/training?

    b. Do you anticipate major changes in your life-style as you look into the future? Will these changes involve relationships? Economic changes? Geographic changes?

12. Now, try to imagine your retirement. How old will you be when you decide to stop working? Do you look forward to this time? What do you expect will be different? What do you hope to do when you're retired that you don't anticipate doing before then? What will you no longer be involved with? Will these changes be effecting your life style (more or less money, selling or buying a home, relationship changes, etc.)?

13. Looking back on 4 years of college, how do you feel about your experience (develop topic some)?

Interview Schedule III

We have asked to interview you because of a change on one of your test scores. We would like to know more about the people, events, and circumstances which influenced this change.

General

1. Do you feel more or less committed to a major?

   To a future career?

2. Did your change in major or change in career come first? Why?

3. Can you identify what factors may have influenced these changes?

4. Have there been any significant personal changes in your life this past year that have pressured or freed you to change your vocation plans?

College and Information Influence

5. Have any courses you have taken been an influence to change your major or career?

   a. In what way did the course influence you?

   b. Was the course easy or difficult for you?

   c. Were you very interested/disinterested in the course content?

6. Have any instructors you have had been an influence to change your major or career?

   a. In what way?

7. Have you received information which has added confusion/made you more sure about your decision for major or career? Where did you get this information?

8. Has there been a change in your outlook concerning attending graduate school?

   a. Financially more able/unable?

   b. Scholastically more able/unable?

   c. Is graduate school a requirement for a career in your major?

9. Is being here in college living up to your expectations as a whole?

   a. The best aspect of being here

   b. The worst aspect of being here

10. What is your grade point average?

Religion and Values

11. Has your religion influenced this major or career change? Have you had a religious experience or a change in religious affiliation?

12. Have any of your values changed? e.g., life style, desire to make a lot of money, desire for high status position, etc.

13. Many people find that their occupations are an opportunity for self-expression. How do you see your choice of a major/career as expressing your values and needs?

Influence of Others

14. Have any members of your family or other relative been an influence in this change in major or career? How do they feel about your change?

15. Have your friends here at college or at home been influential in this change? How do they feel about your change?

16. Do you have any romantic/sexualized relationships that have related to the changes in your major or career decisions?

17. Do you anticipate modifying either your plans or your relationship because of disapproval or pressures?

Self-Awareness

18. Have you felt any differently as a result of being more/less committed to a major or career?

19. Do you feel that others react differently to you as a result of this change?

20. Do you feel that this change in commitment to a major or career has any specific consequences concerning your future behaviors?

    a. Restricted, flexible

Professional Help

21. Do you feel any need for professional assistance to help you with this change -- to decide on a major or to identify careers or future actions related to your major?

22. If you could get the kind of help you really wanted, what would it be? Ideally, when would this help be most useful to you?

Immediate Goals

23. What are your immediate career goals after graduation? (up to 6 months after)

24. Do you feel optimistic that you can get the kind of job you want with your major?

25. Do you feel your major will lead you to an occupation which is the kind of life style you desire?

Long Term Career Plans

26. What type of long term career goals are you aiming for?

27. Are these career aspirations related to your current academic major or minor? If not, how will you get from your major to your career choice?

28. What do you perceive to be the personal or environmental limitations that may prevent you from attaining your career goals?

Personal Orientation

29. How did you decide to make the decision to change your major/career?

    a. Waited until I absolutely had to

    b. Saw the problem coming and made plans to find an alternative

    c. Followed suggestions of others

    d. Just felt like the change would be for the better